

Matthew Haigh, Matthew Shapiro and Nicholas Taylor

## **THE SCIENCE OF CLIMATE DISCOURSE**

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Dr Matthew Haigh, Email: [haighmatthew@yahoo.com.au](mailto:haighmatthew@yahoo.com.au). Aarhus School of Business, Aarhus University.

Dr Matthew A. Shapiro, Email: [matthew.shapiro@iit.edu](mailto:matthew.shapiro@iit.edu). Illinois Institute of Technology, Chicago.

Nicholas Taylor, Email: [nicholas@outcrop.com.au](mailto:nicholas@outcrop.com.au). Outcrop -- consultancy research on environmental, social and economic issues. Melbourne.

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### **ABSTRACT**

Clashing discourses can derail programmes of social change. The management of climate change provides an illustrative case. Describes the sets of arrangements by which carbon emissions data are obtained, reported and verified. Finds a market language has penalized regions most exposed to the effects of climate changes and left the portfolios of Western investors materially exposed to risks. This is of concern as time horizons of investors are correlated with predicted changes in greenhouse gas levels. A call is made for alignment of the discourse. Key words: reported speech, visual rhetoric, distinctive feature analysis.

## THE SCIENCE OF CLIMATE DISCOURSE

### INTRODUCTION

Perhaps for too long, knowing that activity is illusion but doing it anyway has been a conclusion that could be drawn from studies on the social responsiveness of financial services (e.g., Owen, 1990, 2008). Recent comment suggests a strengthened participation of institutional investors in social programs (e.g., Bernstein, 2008; Clark and Hebb, 2005; Hagerman, 2007; Okereke, 2007). The management of climate change provides opportunity for assessment.

Climate management has brought the global North and global South together as never before. Linkages between the effects of climatic changes and widespread and sustained poverty (e.g., Butler, 2008a, 2008b; Friel et al., 2008) are potentially sufficient to bring climate management under the purview of the United Nations International Covenant on Economic, Social and Cultural Rights, which would cast responsibility on the entire financial apparatus<sup>[1]</sup>. Given the ample data on the consequences of climatic changes on economic systems, it is bewildering that the management of climatic changes seems to have excluded the global capacity of financial services. Special-purpose infrastructure created by the World Bank has left institutional investors (pension funds, insurance schemes, hedge funds and others) on the periphery. Appeals for additional financial resources made by the United Nations Framework Convention on Climate Change (UNFCCC) have been directed at individual citizens and civil society organizations, not institutional investors.<sup>[2]</sup>

How have investors engaged if at all in identification of the economic and social effects of climate change? Investor collectivities such as the Climate Change Working Group attaching to the United

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[1] Article 11 requires parties to the Covenant to “recognize the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions. [States Parties] will take appropriate steps to ensure the realization of this right.” Suggested measures include “making full use of technical and scientific knowledge” which would include, presumably, full use of the global financial apparatus. Article 12 governs the right of everyone to decent levels of health. Downloaded 19 March 2009, <http://treaties.un.org/pages/viewdetails.aspx?srctreaty&id=321&chapter=4&lang=en>.

[2] UNFCCC, FCCC/TP/2008/5, Approaches to monitoring and evaluation of capacity-building at different levels, <http://unfccc.int/resource/docs/2008/tp/05.pdf>. International Finance Corporation, IFC and climate change: unleashing the power of the private sector to mitigate and adapt to climate change, [http://www.ifc.org/ifcext/sustainability.nsf/AttachmentsByTitle/fly\\_ClimateChangebrochure/\\$FILE/ClimateChange\\_6pbrochure.pdf](http://www.ifc.org/ifcext/sustainability.nsf/AttachmentsByTitle/fly_ClimateChangebrochure/$FILE/ClimateChange_6pbrochure.pdf). International Finance Corporation, Banking on sustainability: financing environmental and social opportunities in emerging markets, [http://www.ifc.org/ifcext/enviro.nsf/attachmentsbytitle/p\\_bankingonsustainability/\\$file/final\\_ifc\\_bankingonsustainability\\_w eb.pdf](http://www.ifc.org/ifcext/enviro.nsf/attachmentsbytitle/p_bankingonsustainability/$file/final_ifc_bankingonsustainability_w eb.pdf). All downloaded 19 March 2009.

Nations Environment Programme Finance Initiative, P8<sup>[3]</sup>, ClimateWise<sup>[4]</sup>, The Climate Institute<sup>[5]</sup>, the Carbon Disclosure Project<sup>[6]</sup>, the Europe-based Institutional Investors Group on Climate Change<sup>[7]</sup> and others have claimed that investors deploy climate-related investment strategies, yet, have also complained of an absence of relevant metrics and a restricted range of investment vehicles<sup>[8]</sup>. It seems apposite to investigate what scientists, policy makers and investors mean by ‘climate-related strategies’.

Communications between climate policy makers, industrial firms and institutional investors have received comment on differing utilities of information (e.g., Lohmann, 2005), managerialistic overtones (Leiserowitz, 2006), norms of representation and visualization (e.g., Füssel and Klein, 2006), and competition between rhetorical frames (e.g., Bäckstrand and Lövbrand, 2007; Livesey, 2002).

The evidence we present below suggests climate science, policy makers and financial markets are both functionally interdependent and ideationally separate from each other, which makes for a peculiar set of relations. We point at the inappropriateness of the language used to communicate climatology data and climate policies and suggest that this reflects why investors’ assessments of climatology data have been formed on the basis of secondary information exchanges. We present suggestive evidence that cross-colonialization of the discourses has stymied progress at the very time when privately managed capital is most needed.

In what follows, the theoretical and empirical approaches used are explained. A following section presents the empirical material. We conceptualize the interferences between discourses we identify as the driving force of change and development and remark on the potential for strengthened communications in climate management.

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[<sup>3</sup>] Constituted by a number of British and North American public sector occupational pension funds. Formed in 2008 under the patronage of the British monarchy, P8 has claimed an objective to address climate change at organizational, policy and market levels.

[<sup>4</sup>] Constituted by a number of British insurers. Formed in 2007 under the patronage of the British monarchy, ClimateWise has claimed its members are required to publicly disclose how they have addressed risks posed by global climate behaviours.

[<sup>5</sup>] Funded by an Australian charitable institution. Membership is drawn from commercial interests in health research, climatology and energy generation.

[<sup>6</sup>] Registered in England as a tax-exempt charity and a company limited by guarantee.

[<sup>7</sup>] Constituted by a number of British occupational pension funds.

[<sup>8</sup>] Downloaded 19 March 2009, <http://www.cdproject.net/responding-companies.asp>.

## APPROACH

We recognize climatology scientists, policy advisers attached to national governments, and operators in the financial markets as distinct theoretical objects each constituting and constituted by discourse. Discourse analysis is concerned with how language users produce and interpret language in context. Time and procedure and norms of representation are conceived differently by scientist teams working off the coastlines of the Maldives and brokers in the London Energy Brokers Association dealing in carbon dioxide common units [<sup>9</sup>].

Examined material consisted of field-collected samples. Emphasis is given to narrative and visual analysis. Following Baldvinsdottir et al. (2009) and Buchanan (2001), elementary linguistic units examined include:

- use of vocabulary and semantics, including metaphorical features, “loaded” vocabulary, coded words and expressions (phrases belonging to particular social domains);
- composition, presentation and argumentation;
- the styles of communications, including syntactical and meaning relations between sentences as indicated by features such as schemes of words, passive/active sentences, modality (commitment), and grammatical mood (declarative, interrogative or imperative);
- and the way images work on their own and collaborate with written text to create an argument designed to produce desired effects in a specific audience.

Rhetoric is defined as deliberate uses to which discourse are put and can be identified by the use of undefined terms pivotal to the framing of a text. Attention directed to the contextual significance of the text unit emphasizes some of the features mentioned above and opens up another range of discursive characteristics and effects. Vološinov (1986, p. 13) recognizes signifiers as material, as an integral part of reality, and lending themselves to objective, socially situated linguistic analysis.

Vološinov (1986, p. 112) uses a three-part conception of communicative discourse. The content (theme) of a text (visual, spoken or written) is the referent; two, the syntactic patterns (language structure and word order) used to communicate the referent is reported speech; three, the reported speech is associated with an author and becomes authorial speech. “[T]he autonomous theme thus becomes a theme of a theme” (Vološinov, 1986, p. 115). The three parts are linked by the social

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[<sup>9</sup>] The London Energy Brokers Association accounted for most of the volume and value of carbon emissions allowances and credits traded in 2007 and 2008. The Chicago Climate Exchange (CCX) is a Commodity Futures Trading Commission designated contract market which began continuous electronic trading of greenhouse gas emission allowances and offsets in 2003. CCX’s owner, Climate Exchange plc (ticker: London, CLE) owns the European CX (<http://www.ecx.eu>) – the dominant vehicle of the European Union Emission Trading Scheme, the Montréal CX (<http://www.mcx.ca>), the Insurance Futures Exchange (<http://www.theifex.com>) and has interests in Tianjin CX (<http://www.tianjinclimateexchange.com>). CCX, ECX and MCX trade in and clear carbon credit allowances and futures contracts based on quantized CO<sub>2</sub> emissions. The Insurance Futures Exchange trades in futures based on US tropical wind estimates; its contracts are modeled on reinsurance policies. The Tianjin Exchange was not active at the time of writing.

organization of the reception of signs (the reporting context). The resulting interlinked, contextualized conception of discourse becomes the basic unit of analysis.

The scope of the study was confined to Australia, the UK and the US, regions chosen for their prominence in climate policy and climate-related investment activity and for their variable levels of regulation. A 30-month period of examination was used, November 2006 to April 2009. Data were gathered from reports, interviews, and participation in nine international conferences and seminars in the twelve-month period leading up to the UNFCCC Fifteenth Conference of the Parties in December 2009. Around 280 reports issued in the public domain were used. Just over 50 individual interviews were conducted with scientists, climate policy makers and advisers to asset owners. Interviewees included individuals working and who had worked in the World Bank; the Intergovernmental Panel on Climate Change; the Institutional Investors' Group on Climate Change; and the Carbon Disclosure Project. Interviews were conducted in person, by telephone and email. Two of the authors are members of the Network for Sustainable Financial Markets, an unfunded group of lawyers, financiers and academics which has provided inter alia assessments of financing mechanisms used in national climate management arrangements, and this network was also used.

Examples of the discourse of climate science were selected from the Fourth Synthesis Report of the Intergovernmental Panel on Climate Change. Examples of climate policy discourse were selected reports produced by a UK government agency, The Carbon Trust, in 2007 and 2008. Examples of the discourse of institutional investors were selected from material issued in the public domain by the Carbon Disclosure Project, again in 2007 and 2008. After completing analysis of the selected material, these sources were again reviewed to identify if alternate text was more illustrative of the discourses. This review gave no impression that selecting other material would have significantly affected our perceptions of the gaps between the discourses as represented in the chosen textual material.

## DISCOURSES IN CLIMATE MANAGEMENT

This section presents and compares the discourse genres of climate science, climate policy making and financial services. The latter refers mainly to the reported speech of institutional asset owners such as pension funds and insurers and their advisors. In our textual analyzes, we examine all the textual features described earlier, but in the three sections which appear below we include only those features relevant to the specific selected material. Not all the material analyzed has been presented.

### i. DISCOURSE OF CLIMATE SCIENCE

The Intergovernmental Panel on Climate Control, a body instituted by the World Meteorological Association and the United Nations Environment Programme in 1988 and constituted by governments of States Parties to the UN, has invited policy-making organizations (and anyone else) to use the data and images it produces for their own purposes. This section draws mainly on the IPCC's Fourth

Synthesis Summary Report for Policymakers (namely, IPCC, 2007), which is derived from the IPCC's Fourth Assessment Report which contains the work of IPCC's working groups.<sup>[10]</sup>

Evidence is presented in IPCC (2007) to indicate the likelihood of continued climate trends and their effects on human health. Data are presented on current and projected effects of climate trends on human health include heat-related mortality in Europe; allergenic pollen at previously unrecorded latitude levels; hundreds of millions of people exposed to increased water stress and reduced yields for grain-fed agriculture, particularly in Africa; global coastal flooding; the extinction of up to thirty percent of extant species at year 2000; complex, localized negative impacts on small holders, subsistence farmers and fishers; increasing morbidity and mortality from weather systems; changes in infectious disease vectors and increasing burden from malnutrition, diarrhoeal, cardio-respiratory and infectious diseases. Data are distilled using short, terse paragraphs referencing groups of data points in accompanying coloured figures. A reader is directed to footnoted likelihood estimates of future changes to weather patterns; technical terms are used such as “very likely”, “likely”, “more likely than not”, “very high confidence”, “high confidence” and “medium confidence”.

The UNFCCC and the IPCC have both used visual imagery to communicate “the message” to governmental policy makers, namely:

Tackling climate change will necessitate significant private and public investment, and will help secure the transition to the low-carbon economy, opening up new possibilities for growth and jobs and promoting sustainable development.<sup>[11]</sup>

That the use of language and imagery by the IPCC is ideological rather than merely emphatic and colourful is suggested by the distinct boundaries between reported speech and authorial speech. Features of IPCC (2007) such as compact grammar, standardized paragraph length and stylistic homogeneity suggest a dogmatic style of ideology.

Exhibit 1 below shows a schematic diagram of a type common to the hundreds of IPCC reports and PowerPoint<sup>TM</sup> presentation documents made available for public use. Exhibit 1 makes use of the perspectives of the natural sciences and the social sciences (Füssel and Klein, 2006), both of which focus on the connections between system components.

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[<sup>10</sup>] IPCC's three working groups were formed to collect and analyze evidence from physical sciences; impacts on poorer countries, including adaptation and vulnerability assessments; and import on richer countries, including mechanisms expect to mitigate the effects of climate change.

[<sup>11</sup>] Commission of the European Communities, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Downloaded 23 April 2009, <http://eur-lex.europa.eu/lexuriserv/lexuriserv.do?uri=com:2009:0039:fin:en:pdf>.

*[Insert Exhibit 1 about here]*

Exhibit 1 works on its own and collaborates with surrounding written text to create an argument that climate systems can be known, managed and controlled. Technical language and visual imagery are accompanied by the progressive overtones of phraseology such as “evolution of the theory and practice” and “evolution of the conceptual framework” (IPCC, 2007). Two general problems arise with use of visual media to communicate to spheres of knowledge and practice having different skill sets, meanings and norms to those of the communicators.

One problem concerns the reductionist aspect of diagrams. When system-dynamics are combined with the influence diagrams of the social sciences (IPCC refers to the outcome as its integrated assessment framework), the diagrams become extremely complex. To elaborate briefly, box-and-arrow diagrams in system-dynamic diagrams refer to physical flows of resources. In influence diagrams, boxes and arrows represent assumptions, value systems and relational concepts. To distinguish between the two, the IPCC has devised certain diagrammatic modifications. Human actions are indicated by boxes with rounded corners; rectangular boxes refer to non-human events; the thicknesses of borders mark differences between assessments at global, regional and local levels; arrows can indicate physical, human, functional and information flows; and shading indicates other information. Colour becomes important: Exhibit 1 uses graded, coloured shading of backgrounds moving between brown, green and light blue, and variously coloured boxes linked by coloured-in, multidirectional arrows.

The use of visual media in IPCC (2007) leads to a second problem: the intended users of IPCC reports are not the relevant communities. Institutional investors in the rich economies and communities in the poor regions are given short shrift. The encoded reduction of complexity in Exhibit 1 (all system diagrams are reductionist) is a potential source of confusion for such as an investment analyst contracted to a pension fund (should an investment analyst ever view such a report) seeking unambiguous, standardized data for input to a spreadsheet program. Exhibit 1 is as far, if not farther, from many climate-affected communities. A community on Brazil’s coastline struggling for civil space so it can build a public library that might host a computer connected to the Internet so it can download IPCC (2007) ... (Crawford, in interview).

Adaptation and mitigation measures suggested in IPCC (2007) are at the level of industrial sectors designated as “key” (a rhetorical term). Apart from investment banking services (which link to emissions trading schemes-- the single financial mechanism linked to expectations of future GHG reductions), privately managed investment institutions are not mentioned (possibly a rhetorical outcome). Assessment of mitigation options “emphasising specific technologies” and emissions abatement measures are promoted over measures which would rely on changing the international financial apparatus. Terms such as “financial barriers”, “financial constraints”, “limits to financial capacity” and “financial challenges” appear with “market mitigation potential” and “resistance by

vested interests” in energy supply<sup>[12]</sup>. Carbon emissions trading markets depend on maintenance of high market prices of carbon tonnages and individual applications for World Bank funds. Required “substantial investment flows” may be promoted by the financial derivatives trading mechanism attaching to the compliance period of the Kyoto Protocol (2008-2012) or they may not. The direct discourse and rhetoric work to create an impression that is dialectic relations with energy markets which make it likely that market-induced carbon emissions mitigation will not lead to stabilization of the concentration of GHGs in the atmosphere any time in the twenty-first century.<sup>[13]</sup>

At this point, progressive overtones in IPCC (2007) reappear. The document stridently promotes emissions trading schemes designed for “profitable”, “competitive”, and “synergistic” operation at the level of individual corporations. Suggested carbon emissions reduction (“mitigation”) technologies, policies and measures do not include the financial services sector, which we characterize as a rhetorical, and ideological, device.

Efforts can include diverse elements such as emissions targets; [localized] actions; R&D programmes; adopting common policies [. . .] or expanding financing instruments. (IPCC, 2007)

Mobilising financing of incremental costs of low-carbon technologies is important. (IPCC, 2007)

The modalities of the language and the complexities of diagrammatic representation used in Exhibit 1 support our interpretation that the IPCC uses a discourse of progressive managerialism. The agent is removed and replaced by managerial jargon such as “Climate Process Drivers”. The reductionist diagram of Exhibit 1 presents a macro-managed world placing the viewer in the position of scientist who is able to see climate management from a new perspective: the scientific, enlightened perspective.

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[<sup>12</sup>] The largest single source of anthropogenic (human-induced) greenhouse gases at 25.9 percent of global GHG emissions in 2004. The six officially designated greenhouse gases are: CO<sub>2</sub> - Carbon dioxide; CH<sub>4</sub> - Methane; N<sub>2</sub>O - Nitrous oxide; PFCs - Perfluorocarbons; HFCs - Hydrofluorocarbons; SF<sub>6</sub> - Sulphur hexafluoride. Downloaded 8 March 2009, [http://unfccc.int/ghg\\_data/ghg\\_data\\_unfccc/items/4146.php](http://unfccc.int/ghg_data/ghg_data_unfccc/items/4146.php). “Market mitigation potential” refers to projected outcomes if carbon emissions trading markets were to be used by every carbon emitter (considered unrealistically optimistic).

[<sup>13</sup>] Emissions reductions by 2030 are predicted between 13 Gt CO<sub>2</sub>-eq at a carbon price per tonne of under USD50 and 31 Gt CO<sub>2</sub>-eq at a carbon price per tonne of under USD100 (considered unrealistically optimistic). IPCC estimations of the increase in GHG emissions at 2030 above year 2000 levels are in the range of 9-36 Gt CO<sub>2</sub>-eq (considered most likely an underestimate). Only at the high end of the range of projections presented in IPCC (2007) do projections of the impact of global systemic initiatives on climate management exceed projected impacts of localized measures. The most optimistic projections of both types of measures fall short of the three of the six projected increases in greenhouse gas emissions in 2030. Note is made that the IPCC’s projections of greenhouse gas emissions in 2030 understate likely emission levels and exclude some material sources of contributions to greenhouse gas emissions. The underestimation of GHG emissions is estimated at between 10 and 15 percent.

We conclude on this basis the visual messages and the accompanying text in Exhibit 1 draw on a progressive discourse merging two discourses: a managerialist discourse and a discourse of a broad and systematic perspective. ‘Science has the evidence necessary at hand’ is the policy message: all that is needed, one can infer, is adequate levels of political will and effective financial mechanisms.

## ii. DISCOURSE OF CLIMATE POLICY

The text analyzed in this section is produced by the Carbon Trust, a body created by the UK government in 2001 to promote its carbon emissions trading scheme. The Carbon Trust’s adverts and reports are designed and published by PricewaterhouseCoopers, a global public accounting and business services consultancy. Exhibit 2 below provides six adverts produced for The Carbon Trust.

*[Insert Exhibit 2 about here]*

A hopeful and individual responsibility tone of the largest image in Exhibit 2 is conveyed by the imperative mood of its invitation to entreat: “Let’s Get Started”. An ownership and individual agency ideology is entrenched by a slogan using modal verbs and conveying an action-oriented attitude: “Reduce What You Can, Offset What You Can’t<sup>TM</sup>”. The pronoun ‘you’ creates the subject as the carrier of responsibility for global climate management. Property rights are reinforced by the trademark and attention is directed from the causal agents of carbon emissions. These devices and outcomes indicate an individualistic style of ideology, one that entreats the reader to own the message.

The grammatical mood of the largest image in Exhibit 2 is repeated in the other images. A quotation appearing with the set of four smaller images is as follows.

Carbonfund.org is leading the fight against global warming, making it easy and affordable for any individual, business or organization to eliminate their carbon footprint and hastening the transformation to a clean energy future.

The third-person, passive voice of the quotation above removes responsibility for climate management from organizations and individuals producing carbon emissions at the same time as the vocabulary invites individuals to become agents of their own destinies. The appearance of single-word paragraphs – “Car”, “Plane”, “Home”, “ZeroCarbon” – in four of the images conflate the connotations of a zero-carbon hoped-for reality with material consumption. The four images and the image of the joyful, besuited, white marrying couple all speak to the domains of consumption and material security. In these images, speech has lost its referential meaning and the “décor” has become the substance (Vološinov, 1986, p. 121). The use of text in Exhibit 2 is designed for maximum impact. The strongest possible organization of text partitioning is single-word paragraphs.

[Paragraphing] takes the addressee and his active understanding into decisive account. [The more organized the partitioning, the stronger the] orientation toward listener or reader and calculation of the latter's possible reactions. (Vološinov, 1986, p. 111)

Taking these features into account, it can be inferred that Exhibit 2 is strongly oriented toward the reader. When considering the use of single words with rhetorical features such as use of colour, angles of the subjects of the images, perspective and overall mood, it can be inferred that the author has an objective to persuade citizens as to the merits of market-based carbon emissions management. This is an example of discursive interference. The indirect discourse of material, individualistic consumption is borrowed and placed in a visual, direct discourse of economic sustainability.

In the largest image in Exhibit 2, a sustainability ideology is brought by the vision of the standing child looking back at wind turbines (looking back at the future as she advances in the present). Her age and possible ethnicity (Burns, 2000) marks advocates of wind power (the UK government) as enlightened, responsible agents of sustainability, however that term might be defined. The viewer is led to form an impression that consumption of carbon offsets will produce a future uncluttered by uncertainties; that sacrifices are not needed; that global security can be purchased, owned and trademarked; that personal plans can be achieved, uninterrupted by global crises.

We conclude on this basis the imagery and text in Exhibit 2 draw on a managerialist discourse merging three discourses: a sustainability discourse, progress through financial instruments discourse and a human relations discourse.

Explanation of the use of signs of material progress and consumption to promote a program of carbon emissions mitigation can be found in the origins of the UK and European carbon emissions trading schemes. In the hope it might be found useful, a brief summary is provided here. The presence of pre-Kyoto Protocol (pre-1998) carbon taxes in several European states were not sufficient to persuade the European Commission to introduce an EU-wide carbon tax. The Commission was more receptive to pressure coming from various sources for introduction of regional emissions trading schemes<sup>[14]</sup>. A principal source of pressure for an EU trading scheme was the UK<sup>[15]</sup>. Britain's emissions trading scheme was not developed by the UK government but by British Petroleum plc (ticker: NYSE, BP). In 1999, BP had launched an internal GHG emissions trading scheme<sup>[16]</sup>. In 2000, a related party to BP was appointed to the UK Department for the Environment to become head of the Emissions Trading Group secretariat, which was made responsible for developing the UK scheme. After the UK scheme

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[<sup>14</sup>] Directorate-General of the Environment, European Commission, COM-98-353, 998, Climate Change: Towards an EU Post-Kyoto Strategy. Downloaded 23 April 2009, [http://ec.europa.eu/environment/docum/pdf/98353\\_en.pdf](http://ec.europa.eu/environment/docum/pdf/98353_en.pdf).

[<sup>15</sup>] House of Commons Committee of Public Accounts, The UK emissions trading scheme: a new way to combat climate change, Forty-sixth Report Session 2003-2004, Evidence Q12. Downloaded 23 April 2009, <http://www.publications.parliament.uk/pa/cm200304/cmselect/cmpubacc/604/604.pdf>.

[<sup>16</sup>] BP America, Gas power and NGL: wholesale power, emissions trading. Downloaded 23 April 2009, <http://www.bp.com/sectiongenericarticle.do?categoryId=3050070&contentid=3050082>.

had been launched in 2002, one of the first recipients was BP, which received a payment of GBP18.9 million from the UK government in return for joining the scheme<sup>[17]</sup>.

The development strategy of the UK emissions trading scheme was to establish a market which would gain for itself credibility in the City of London<sup>[18]</sup>. Scheme participants that reduced their GHG emissions below a government-set initial threshold level of allowances could sell their “unspent” allowances at the market price<sup>[19]</sup>. The immediate price crash of trading credits in the UK scheme on its launch did not deter the European Commission<sup>[20]</sup>, which consulted BP and other architects of the UK scheme such as the European Petroleum Industry Association before launching its own scheme in January 2005<sup>[21]</sup>. These influences ensured that manipulated trading was a common feature of the UK and European schemes<sup>[22]</sup>. Generous emissions allowances granted subsequently under National Allocation Plans have, like the images in Exhibit 2 above, promoted consumption and production above mitigation and reduction of GHG emissions levels.<sup>[23]</sup>

### iii. DISCOURSE OF CLIMATE-RELATED INVESTMENT ACTIVITY

Documents issued from the scientific community such as IPCC (2007) and from policy makers such as The Carbon Trust and Stern (2008) contain claims that climate vulnerability assessments have been

<sup>[17]</sup> National Audit Office, The UK emissions trading scheme: a new way to combat climate change, UK Parliament House of Commons, Appendix 1, p. 35. Downloaded 23 April 2009, [http://nao.gov.uk/publications/nao\\_reports/03-04/0304517.pdf](http://nao.gov.uk/publications/nao_reports/03-04/0304517.pdf).

<sup>[18]</sup> Testimony from Sir Brian Bender and Henry Derwent of the Department for Environment, House of Commons Committee of Public Accounts, The UK emissions trading scheme: a new way to combat climate change, Forty-sixth Report Session 2003-2004. Downloaded 23 April 2009, <http://www.publications.parliament.uk/pa/cm200304/cmselect/cmpubacc/604/604.pdf>.

<sup>[19]</sup> House of Commons Committee of Public Accounts, The UK emissions trading scheme: a new way to combat climate change, Forty-sixth Report Session 2003-2004, Figure 1, p. 3. Downloaded 23 April 2009, <http://www.publications.parliament.uk/pa/cm200304/cmselect/cmpubacc/604/604.pdf>.

<sup>[20]</sup> National Audit Office, The UK emissions trading scheme: a new way to combat climate change, UK Parliament House of Commons, Executive Summary Key Finding No. 2. Downloaded 23 April 2009, [http://nao.gov.uk/publications/nao\\_reports/03-04/0304517.pdf](http://nao.gov.uk/publications/nao_reports/03-04/0304517.pdf).

<sup>[21]</sup> Emissions trading, issues and policies: climate change. <http://www.europia.com/content/default.asp?PageID=416>. Details of the European scheme are available at [http://ec.europa.eu/environment/climat/pdf/emission\\_trading2\\_en.pdf](http://ec.europa.eu/environment/climat/pdf/emission_trading2_en.pdf). All documents downloaded 23 April 2009.

<sup>[22]</sup> National Audit Office, The UK emissions trading scheme: a new way to combat climate change, UK Parliament House of Commons, Sections 2.5 and 2.7. Downloaded 23 April 2009, [http://nao.gov.uk/publications/nao\\_reports/03-04/0304517.pdf](http://nao.gov.uk/publications/nao_reports/03-04/0304517.pdf).

<sup>[23]</sup> Department for Environment Food and Rural Affairs, UK National Allocation Plan Phase 1, DEFRA UK - Environment - Climate Change - Trading - EU Emissions Trading Scheme, 17 September 2007. Downloaded 23 April 2009, <http://www.defra.gov.uk/environment/climatechange/trading/eu/operators/phase-1.htm>.

designed to meet the information demands of investment institutions: that “all types of investment are growing [. . .] coming from a widening cross-section of the finance community”<sup>[24]</sup>.

Privately managed capital, accounting for USD74.3 trillion at 2007<sup>[25]</sup> (World Bank estimates of project finance granted for Kyoto Protocol-registered energy projects over 1997-2005 were USD 13.3 trillion), appears not to have heard the news. Estimates presented by the World Bank (which might be expected to be optimistic) put direct private investments in carbon emissions rights and project-based mechanisms at USD 9.5 billion in 2007, or 0.7 percent of total funds under private management (see, Capoor and Ambrosi, 2008).

Suggestions have been made that perhaps not more than one in ten asset owners has taken steps to measure its portfolio level exposure to risks posed by global climate management requirements<sup>[26]</sup>. Our interview work suggests structured factoring of reported likelihood impacts of climate changes on ecosystems and human health is not followed in standard portfolio construction.

I have been involved in the advising of boards of pension trustees for thirty years. Boards are interested in one thing [and that is] paying off their liabilities. They are looking at absolute returns, not on hedging risks and showing concern on this and that issue, but on having sufficient funds to pay off their liabilities. At any rate, on [the existence or not of] climate change, 95 percent of [workers in] the City [of London] don't get it and aren't about to get it. (Adviser M, in interview)

Examination of written material and inquiries of professional presenters, including educators working in financial services, indicated an ignorance of basic facts and policies on climate management. Only one of ten presenters interviewed at two climate management conferences held for investors (both in Europe and in 2009) was aware of IPCC-produced terms such as climate mitigation, adaptation, greenhouse gas stabilization concentrations, anthropogenic warming and global warming potential, and none was familiar with published projections of the impacts of climate projections on global water, food, coastal areas and human health<sup>[27]</sup>. At the investor workshops on climate management which one

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<sup>[24]</sup> IPCC Working Group III, obtained from Mr. D. Tirpak, one of the authors of IPCC (2007), dennis at tirpak.com, 23 March 2009.

<sup>[25]</sup> International Financial Services, downloaded 24 March 2009, [http://www.ifsl.org.uk/upload/CBS\\_Fund\\_Management\\_2007.pdf](http://www.ifsl.org.uk/upload/CBS_Fund_Management_2007.pdf).

<sup>[26]</sup> Australian source: Climate Institute, Funds survey results, <http://www.climateinstitute.org.au/images/SuperSurveyReport.pdf>. US source: National Association of Insurance Commissioners, Insurer climate risk disclosure survey, [http://www.naic.org/documents/committees\\_ex\\_climate\\_climate\\_risk\\_disclosure\\_survey.pdf](http://www.naic.org/documents/committees_ex_climate_climate_risk_disclosure_survey.pdf). Both documents downloaded 23 March 2009.

<sup>[27]</sup> Use of the modelling constructed by C. Hope is reproduced in the IPCC Special Report on Emissions Scenarios ([http://www.grida.no/publications/otheripcc\\_sr/?src=/climate/ipcc/emission](http://www.grida.no/publications/otheripcc_sr/?src=/climate/ipcc/emission)). Its use in policy advice was decided following discussion in the UK Parliament in 2005 (as contained in the following two documents: Memorandum by Dr Chris Hope, Select Committee on Economic Affairs, House of Lords, 14 January 2005,

of the authors attended, terminology used included “market opportunities in what we believe”, “stress-testing the asset allocation on climate change”, “an alternative way of fuelling our modern lifestyle” and “sustainable alpha” (better than average income-producing performance) where such “can add value across classes, investment styles, geographically and in specialist focus”. The latter item, it should be noted, provides an example of parallax contradiction. Promotion of market-led climate management necessarily promotes uncoordinated attempts of investors to beat the rest of the market. Policy as formulated by the IPCC (and any sensible policy) includes argument for coordinated management measures.

A factor contributing to an impasse between science communications and institutional investors might be the latter’s widespread use of the Markowitz (1952) efficient frontier analysis in portfolio construction processes<sup>[28]</sup>. Reliance on standardized data such as quoted asset prices and predetermined funds inflows would preclude, in the usual case, the use of data points as published by climate science. Untested, exotic products such as trading in carbon emissions rights with no guarantee of continuance beyond 2012 and insurance products such as catastrophe bonds, climate risk futures and climate-related exchange traded contracts<sup>[29]</sup> are not in the standard purvey of trustee management.

**The Carbon Disclosure Project.** The text analysed in this section is produced by the Carbon Disclosure Project, a not-for-profit organization formed in 2002 by North American and European institutional investors. CDP has followed a practice of sending annual information requests of companies appearing in the world’s most popular stock indexes (Global Financial Times 500, Nikkei, Standard & Poor’s 500, FTSE 350, FTSEurofirst 300, ASX 200, NZX 50, and others). The information request addresses a company’s energy uses, any allowances and credits allocated and purchased under carbon emissions trading schemes, and the ways in which a company identifies and acts to reduce carbon emissions associated directly and indirectly with its operations.

The purpose of gathering all this information is to create a standard to rank the carbon management of responding companies, termed by the CDP as the ‘Carbon Disclosure Leaders Index’ (CDLI). The

<http://www.publications.parliament.uk/pa/ld200506/ldselect/ldconaf/12/5011805.htm>; Supplementary Memorandum by Dr Chris Hope, Select Committee on Economic Affairs, House of Lords, 11 February 2005, <http://www.publications.parliament.uk/pa/ld200506/ldselect/ldconaf/12/5011808.htm>.) This emissions scenario modelling is referred to and used in IPCC (2007) and from the basis of UNFCCC climate policy. All documents were downloaded 18 April 2009.

<sup>[28]</sup> Markowitz (1952) posited that a theoretical relationship of the variance of returns on an investment, relative to the mean or expected returns on that investment, holds valid under all conditions. The suggestion is formally built into the Tobin-Markowitz ‘modern portfolio theory’ (Markowitz, 1971) on which capital markets are based. If investors are risk averse, the theory suggests a fundamental relation between investment return and investment risk and assumes that a representative rational investor can reduce financial risk by spreading it over a number of different assets. The theory would also hold that investment intentions are based only on investor beliefs regarding the future expected return and variance of returns of combinations of assets and the covariance of those returns with other financial assets in the investor’s portfolio.

<sup>[29]</sup> Deutsche Bank Research, Coping with climate change: the role of financial markets, Frankfurt am Main, 2007, ISSN: 1612-314X.

Index is based on two scores: a CDLI score based on the percentage of questions a company answers in the information request, and a ‘Carbon Intensity’ score based on a company’s reported carbon emissions.

The CDP has hired for this purpose the consultancy Innovest Strategic Value Advisors, Inc., owned by the RiskMetrics Group, Inc. (ticker: NYSE, RMG, itself part of the J. P. Morgan group (ticker: NYSE, JPM)). (In 2007 and 2008, compilation of the CDLI report was been performed by the consultancy PricewaterhouseCoopers.) While calculation of ‘Carbon Intensity’ scores is straightforward, its implications are not, particularly when compared with corresponding CDLI scores and rankings of carbon management based on direct carbon emissions alone.

The remainder of this section examines the discourse of investors by providing two quantitative analyses of CDP’s rankings of companies’ ‘carbon performance’ and by illustrating the production of information used in construction of the CDLI. Data for the analysis included in this section are based on first-hand interviews with advisors to the CDP, from reports and the online database provided by the CDP and from desk research.<sup>[30]</sup>

The section concludes with a summary analysis of the three discourse genres.

Given two companies which have emitted equivalent amounts of carbon dioxide-equivalent tonnages over a given period, that which has produced the greater accounting revenues in that period will be quoted with a lower carbon intensity and, as such, represented as a more efficient carbon manager. This is of value to CDP signatories as a more efficient carbon manager represents a lower risk to an investor in terms of exposure to possible future expensive mitigation and adaption requirements.

Calculation of a company’s carbon intensity can be illustrated using the case of Royal Dutch Shell (ticker: NYSE, RDS.A). Shell disclosed in the CDP information request of 2007 that its global production processes in that year had generated 92 million metric tonnes of carbon dioxide-equivalent emissions<sup>[31]</sup>. Innovest deflated that figure by the total of Shell’s revenues in 2007 (USD433.9 million). The result (212) was referred to as Shell’s direct carbon intensity. Its division by the oil and gas sectoral average of 435 (result: 0.4873) was referred to as a direct carbon intensity ratio, and used to represent Royal Dutch Shell as just under half as carbon-intense as its sectoral peers in 2007, even though the volume of carbon emissions produced by Shell in 2007 exceeded the average emissions of companies in the oil and gas sector of the Global FT 500 index (33.8 million tonnes) by a factor of 2.7.

CDP’s claim that its work has contributed to the abilities of investors to gauge companies’ exposures to climate-related risks can be challenged on at least two fronts. Rather obviously, deflation of self-

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<sup>[30]</sup> The data can be found online at <http://www.cdproject.net/responding-companies.asp>, downloaded 10 May 2009.

<sup>[31]</sup> Emissions of non-CO2 greenhouse gases are converted to metric tons CO2 equivalent using the one-hundred-year Global Warming Potential values established by the Intergovernmental Panel on Climate Change, yielding a CO2 common unit of emissions quantification.

disclosed carbon emissions volumes by published revenue figures diverts attention from heavier emitters<sup>[32]</sup>. Figure 1 below presents a partial analysis of CDLI and Carbon Intensity scores and reported carbon emissions appearing in the CDLI report of 2008. Our analysis of the entire CDLI report of 2008 is available for the interested reader. The reader may access the data at the CDP website [fn with link: <http://www.cdproject.net/responding-companies.asp>, downloaded 10 May 2009] for further review.

*[Insert Figure 1 about here]*

Figure 1 indicates that when revenue figures are used to assess companies' carbon management, the results are different than what would be represented if carbon management were to be assessed simply by volumes of carbon emissions. Within-sector CDLI scores corresponded to within-sector carbon intensity scores and within-sector direct emissions rankings for only one of the nine sectors shown in Figure 1: respectively, Nissan Motor in the construction sector, and Suncor in the oil and gas sector.

For three companies in three sectors, carbon management as represented by carbon intensities (where Scope 1 carbon emissions are deflated by global or sectoral annual revenues) was better than that represented by Scope 1 carbon emissions alone (BASF, Nissan Motor, and Tesco).

For another three companies in another three sectors, carbon management as represented by carbon intensities was worse than that represented by Scope 1 carbon emissions alone (Suncor, Barclays, and EMC).

As it is the relations between a company's carbon emissions and its position along the CDLI spectrum that can be considered integral to the discourse of climate-related investment activity, a fuller investigation was considered useful.

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<sup>[32]</sup> The calculation of carbon intensity, also referred to by CDP as 'financial emissions intensity', appears germane to CDP not industry practice. CDP's carbon intensity calculation distinguishes carbon-equivalent emissions according to 'direct emissions' resulting from a company's revenue-generating operations (Scope 1), indirect GHG emissions resulting from purchased electricity (Scope 2), and other types of indirect CO<sub>2</sub>-equivalent emissions related to employee travel, distribution networks and suppliers (Scope 3). The three distinctions appear to have been taken from the GHG Protocol Project Quantification Standard issued by The Greenhouse Gas Protocol Initiative, a program of the World Resources Institute (downloaded 4 May 2009, <http://www.ghgprotocol.org/files/ghg-protocol-revised.pdf>). The term carbon intensity does not appear in the GHG Protocol Standard; that Standard assesses carbon management of a company by reference to purchased quantities of commercial fuels and published emission factors and not by taking into account published revenue figures. Neither does CDP explain the exclusion of indirect emissions in its Carbon Intensity calculation. Rationale cannot be that it is direct emissions that are regulated in some jurisdictions: the UK ETS has required participants to account for GHG emissions from the generation of purchased electricity.

Three models were used to examine the entire set of 230 companies used in the CDLI report of 2008. The dependent variable of Model 1 is a sector-based CDLI ranking; rankings of volumes of carbon emissions are an independent variable. A within-sector approach was applied to control for what were expected to be large differences in CDLI rankings and carbon emissions within each sector. Carbon emissions rankings within-sector are created using the sum of Scope 1 (direct) and Scope 2 (indirect) emissions of tonnes of carbon dioxide-equivalent. Scope 1 and Scope 2 emissions form a small component of the CDLI score (6 from 176 possible points) and the relation between the two variables is expected to be negative. We omitted from the analysis questionnaire respondents who did not provide complete information, who did not allow for their responses to be made public, and who failed to submit their responses in time for publication. Sectors considered too small to be considered here included construction and transportation and logistics. Variances by numbers of respondents in nine remaining sectors are controlled by a dummy variable for each sector.

Figure 2 below shows the results of Model 1. A statistically significant and, as expected, negative relationship exists between CDLI rankings and carbon emissions rankings. That is, as a company progresses down (up) the rankings of carbon emitters within its sector, the same company rises (descends) in the CDLI rankings. (Note that this explanation is based on a ranking of “1” being the highest ranking.) For each downward shift in a company’s emissions ranking, the corresponding CDLI ranking position increases nearly one-quarter of a rank.

*[Insert Figure 2 about here]*

The dependent variable common to Model 2 and Model 3 is the CDLI scores. Volumes of carbon emissions are used as an independent variable in both Model 2 and Model 3. Sector-based dummy variables are excluded from Model 2. Sector-based dummy variables are included in Model 3 to control for the impact of total carbon emissions (Scopes 1 and 2) on the raw CDLI score. The relations between the dependent and independent variables in Model 2 and Model 3 are expected to be negative.

Figure 2 above shows the results of Model 2 and Model 3. As expected, both models exhibit negative relationships between the dependent and independent variables. In Model 2, with industry dummy variables excluded, the coefficient is statistically significant. The inclusion of industry dummies (Model 3) appears to produce a statistically insignificant result for the model.

The CDP has produced a report which evidently provides mixed signals. Quoted carbon intensities can be used to support argument that it is heavy polluters which represent more promising investment potential, while CDLI scores and carbon emissions can be used to support argument that it is heavy polluters whose carbon management needs to be improved.

Would these anomalies of representation produced by an artefact of method not be noticed by investment analysts and asset managers contracted to CDP signatories? Perhaps not, given that the

Carbon Disclosure Leadership Index correlates derived carbon intensities with accounting profits relative to assets (annual profit/value of total assets). That correlation in 2008 associated lower-quoted carbon intensities (that is, better carbon managers) with higher profits relative to assets, yielding, quote, a “win/win”<sup>[33]</sup>. Perhaps the significance of the discourse lies in its utterance rather than its use. The first-named author asked a previous preparer of the Carbon Disclosure Leadership Index how she would expect investors to use the Index. Her reply was:

If it has a number in it the analyst can usually plug it into their [sic] model as an additional cost. Many don't even look at the CDP rankings, to be quite honest, they just use it for information, for a general decision making feeling, whether it's a comfort type of thing [or not]. (Analyst Y)

Even so, a question can be raised as to the integrity of the information used to construct the Carbon Disclosure Leaders Index. Complication of the CDLI in 2007 and 2008 by PricewaterhouseCoopers (for which the latter has paid Innovest an undisclosed sum) brings a certain redundancy of effort. A corporation can seek external verification of its carbon emissions from commercial providers such as PricewaterhouseCoopers' sustainability practice. PricewaterhouseCoopers, in multiple capacities as agent of the CDP; auditor of some of the companies reviewed by CDP; founder and director of the Global Reporting Initiative whose reporting formats appear in corporate sustainability reports; and, through its sustainability practice, assurance provider of the sustainability reports published by some of the companies reviewed by CDP, has found itself providing assurance and 'awarding' companies for its own auditing, assurance and consulting work.

The sets of arrangements by which carbon emissions data are obtained, reported and verified demands a little more exposition. So as to provide continuity with the material above, the 2007 sustainability report of Royal Dutch Shell is used as illustration<sup>[34]</sup>. Shell used PricewaterhouseCoopers to “fact-check the data” in Shell's Sustainability Reports produced over the period 1997-2004. From 2005, Shell has used a self-appointed External Review Committee to provide assurance regarding the integrity of its Sustainability Reports<sup>[35]</sup>. The independence of Shell's External Review Committee is compromised for reason that Shell and PricewaterhouseCoopers share significant economic and governance influence over five of the six organizations represented. The associations of PricewaterhouseCoopers and Shell with the members of Shell's ostensibly independent External Review Committee are as follows.

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<sup>[33]</sup> Downloaded 19 March 2009, <http://www.cdproject.net/Carbon-Disclosure-Leadership-Index.asp>.

<sup>[34]</sup> Downloaded 8 May 2009, [http://sustainabilityreport.shell.com/2007/servicepages/downloads/files/entire\\_shell\\_ssr07.pdf](http://sustainabilityreport.shell.com/2007/servicepages/downloads/files/entire_shell_ssr07.pdf).

<sup>[35]</sup> Downloaded 8 May 2009, [http://www-static.shell.com/static/responsible\\_energy/downloads/our\\_approach\\_to\\_reporting/ext\\_rev\\_comm/erc\\_terms\\_of\\_reference.pdf](http://www-static.shell.com/static/responsible_energy/downloads/our_approach_to_reporting/ext_rev_comm/erc_terms_of_reference.pdf).

1. The Energy Resources Institute is influenced through a controlling interest of Shell in Bharat Petroleum Corp. Ltd. (ticker: Bombay, BPCL)[<sup>36</sup>].
2. Anglo-American plc (ticker: London, AAL) and Shell have joint commercial interests in the development of several energy projects[<sup>37</sup>].
3. One of the trustees of Living Earth lists Shell as a client in his consultancy practice[<sup>38</sup>].
4. The executive board of Business for Social Responsibility lists a vice-president at Shell[<sup>39</sup>].
5. The advisory council of Transparency International lists a partner of PricewaterhouseCoopers UK[<sup>40</sup>].
6. The International Institute for Sustainable Development does not appear to have a contractual affiliation with Shell or PricewaterhouseCoopers[<sup>41</sup>].

It may appear that as PricewaterhouseCoopers helped establish the Global Reporting Initiative in 1998, and since 2003 has provided recurrent grants to that organization, that having a member of PricewaterhouseCoopers on Shell's External Review Committee provides a useful source of expert knowledge[<sup>42</sup>]. A question goes to the financial interdependence of the Global Reporting Initiative and PricewaterhouseCoopers. The former is financially dependent on the latter, while the latter has benefited economically from the existence of the former. When reviewing Shell's sustainability reporting processes and outcomes in its capacity as External Review Committee member, a PricewaterhouseCoopers partner is hardly likely to raise criticisms as to the reporting basis or suggest alternate reporting models that might better suit the reporting of Shell's operations.

A further question goes to the financial auditing services provided by PricewaterhouseCoopers to Shell in 2007, for which PricewaterhouseCoopers earned USD48 million[<sup>43</sup>]. PricewaterhouseCoopers has helped develop and maintain a set of reporting guidelines which has provided it a consulting revenue stream from sustainability reporters, including Shell. Another fee is earned for financial audits of some of those companies, including Shell. And another fee is provided by compilation of the Carbon

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[<sup>36</sup>] Downloaded 8 May 2009, [http://www.bharatpetroleum.com/General/CR\\_Journey.aspx?id=4](http://www.bharatpetroleum.com/General/CR_Journey.aspx?id=4).

[<sup>37</sup>] Downloaded 8 May 2009, <http://www.angloamerican.co.uk/aa/media/releases/2006pr/2006-05-25>.

[<sup>38</sup>] Downloaded 8 May 2009, <http://www.livingearth.org.uk/whatweare/trustees.html>, and <http://www.nmaenvironment.co.uk/about.html>.

[<sup>39</sup>] Downloaded 8 May 2009, <http://www.bsr.org/about/board-of-directors.cfm>.

[<sup>40</sup>] Downloaded 8 May 2009, [http://www.transparency.org/about\\_us/organisation/adv\\_council](http://www.transparency.org/about_us/organisation/adv_council).

[<sup>41</sup>] Downloaded 8 May 2009, [http://www.iisd.org/pdf/2007/iisd\\_brochure\\_2007.pdf](http://www.iisd.org/pdf/2007/iisd_brochure_2007.pdf).

[<sup>42</sup>] Downloaded 8 May 2009, <http://www.pwc.com/extweb/service.nsf/docid/1f31bab1834d5d8485256d90006c4248>.

[<sup>43</sup>] PricewaterhouseCoopers was retained as the single auditor of Royal Dutch Shell in 2007, replacing the joint audit arrangement of previous years. Audit fee data downloaded 8 May 2009, [http://www.annualreportandform20f.shell.com/2007/servicepages/downloads/files/audit\\_fee\\_shell\\_20f\\_07.xls](http://www.annualreportandform20f.shell.com/2007/servicepages/downloads/files/audit_fee_shell_20f_07.xls).

Disclosure Leaders' Index. Professional independence, the cornerstone of assurance services, has been compromised.

As a discourse item, the Innovest “carbon intensity” calculation confers meaning to scientific data for investment analysis and brings another postmodern meaning where more can mean less, that is, where producing carbon emissions can mean efficient environmental management. As well, this is an example of discursive interference. The author of the speech act has altered the referent. Carbon emissions have the potential to be associated with both efficient and inefficient environmental management, depending on the amount of revenue.

The data we gathered from institutional investors used what we characterize as a discourse of opportunism combined with an encoding rhetoric that borrows from an investment analysis discourse. The outcome is framed by a perspective that the appearance of climate management constitutes a legitimating device. The characterization has implications for the fiduciary obligations of asset owners as the investment horizon of a pension fund or insurance scheme would fall within the critical period for most of the climate events predicted by the IPCC.<sup>[44]</sup>

**Summary analysis.** The remainder of this section summarizes the analysis using a distinctive feature analytic approach. Originally formulated for analysis in phonology research<sup>[45]</sup>, distinctive feature theory is considered an effective inter-disciplinary tool to investigate the relationships between words and images based on distinctive criteria while maintaining the uniqueness of items under analysis (Blachowicz et al., 2006; Readance and Searfoss, 1980).

To translate the distinctive feature method to a comparative analysis of discourses used on climate science, climate policy making and financial services, a set of distinctive features of these discourses is produced. This set is based on the characteristics derived from the linguistic analyses presented above.

The following set of distinctive features is used. A simple + or - system is used to indicate feature possession.

1. Composition [comp]. This feature identifies sentence-level and paragraph-level composition. [+comp] indicates that compositional grammar is compact. [-comp] indicates that compositional grammar is relaxed, involving non-standardized partitioning of the text.

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<sup>[44]</sup> Most likely global estimates include a 90 percent increase to global GHG emissions and complex effects due to concurrence of increased water stress; up to 30 percent of species at increasing risk of extinction; negative impacts on small land holders, farmers and fishers; about 30 percent of global coastal wetlands lost, and increasing burden on healthcare from malnutrition, diseases, heat waves, floods and droughts. In terms of portfolio management, basic awareness of such risks would extend to projected regional impacts.

<sup>[45]</sup> Phonology is the study of how sounds are organized and used in natural languages. Phonology analyzes the sound patterns of a particular language by determining which phonetic sounds are significant and explaining how these sounds are interpreted by the native speaker.

2. Presentation [pres]. [+pres] indicates that presentation is of an emotive mood, designed to produce an emotional effect in the reader. [-presr] indicates that presentation is rational, emphasizing the utility of the referent. [-presa] indicates that presentation is authoritarian in style and, usually, stripped of the author's intonations.
3. Argumentation [argu]. This feature identifies the urgency of the author of reported speech. [+argu] indicates that the reported speech uses words and phrases which problematize and explain the referent. [-argus] indicates the use of words and phrases which problematizes, explains and solves the referent. [-argug] indicates that the reported speech uses words and phrases which express the referent in terms of personal gain accruing to the audience.
4. Use of "loaded" vocabulary and coded expressions [loco]. This feature identifies the direction of the reported speech. [+loco] indicates that the reported speech -- and possibly its referent -- use domain-specific expressions understood only by a select audience . [-loco] indicates understanding by a wider audience.
5. Schemes of words [scheme]. This feature identifies the compactness of reported speech. [+scheme] indicates that passages are written and spoken in a connective style, where the reporter actively interprets the referent. [-scheme] indicates that passages are written and spoken in a disjointed style in which the text tends to be preserved as a distinct linguistic unit.
6. Voice [voice]. [+ / - voice] indicates that sentences are written and spoken in the active (passive) voice. Other voices are ignored for analytical purposes.
7. Modality [modal]. Modality gives of the extent to which the text is communicated as reality. [+modal] indicates that sentences indicate consequences conditional on other actions. [-modal] indicates that sentences are indicated as statements of fact.
8. Grammatical mood [mood]. [+ / - mood] indicates that sentences are written and spoken in an imperative (declarative) mood. Other moods are ignored for analytical purposes.
9. Use of visual rhetoric [vis]. This feature identifies the use of signs in reported speech. [+vis] refers to use of images, diagrams and graphs for purposes of persuasion. Encoded use of colour falls into this category. Imagery may or may not be accompanied by written and verbal text. [-vis] indicates the referent has been left intact.

All the features listed above can be considered to indicate the presence, style and strength of ideology in discourse. Figure 3 below present a summary of the distinctive feature analysis.

*[Insert Figure 3 about here]*

The patterns of linguistic features in the examined discourses can be compared using Figure 4 below.

*[Insert Figure 3 about here]*

Examination of the patterns in Figure 4 illustrates the ideological content of the discourses of climate science, climate policy formulation and financial services. Factors 1, 2, 3, 4, 8 and 9 from above, in particular, indicate the use of rhetoric in speech. Generally, the presence of a '+' tends to indicate ideological use of referent text; the aspect of ideology is brought out more strongly if comparing the number of '+'s in each pattern. The sequences appearing against climate science discourse in Figure 4 indicate a dogmatic, monologic style. Policy discourse and financial services discourse indicated individualistic and ideological styles. In those discourses, intended audiences are entreated to 'own' the referent. The discourse of financial services is also directed to those who own the coded language. All three discourses make use of visual rhetoric: a progressive rhetoric from the IPCC; a consumerist rhetoric from the Carbon Trust; a risk—investment revenue solution from the CDP.

The similarities in linguistic patterns of policy makers and financial services appearing in Figure 4 above might be interpreted as indicating a type of synergy. The reality is quite different. Some of the schematic patterns, moods, modalities, "loaded" vocabulary and coded expressions have been borrowed from each other. The discourses of policy makers and financial services do not preserve the referent (climate science data) but interpret it for their own purposes. Neither is climate science immune from such interdiscursive borrowing. The discourse of climate science supports World Bank infrastructure by maintain a rhetorical silence on the global capacity of privately managed capital. It is to the potential of the closed-off communications for activity towards an agreed-upon goal that a few remarks must be made.

## CONCLUDING REMARKS

The dissemination of scientific climate data in graphical form, replete with calibrated expressions of uncertainty and confidence levels, has not been and is not likely to be taken up by networked asset analysts, managers, and owners. Investors have shown more concern over issues of fungibility (capacity of a financial item to be traded), delivery of contracts, registration of projects with the International Transaction Log, news of publicly listed project aggregators going into administration, regulatory uncertainty and non-standardized income streams<sup>[46]</sup>).

The imbrication of social security systems, climate patterns and institutional finance makes the level of required political commitment to financial innovation pressing and formidable. Derivative markets supported by projects located in poor countries are not likely to satisfy the financing levels needed to

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[<sup>46</sup>] Precipitating issue of 'explanatory' material for institutional investors from the Boston College Center for Corporate Citizenship (downloaded 24 April 2009, [http://bcccc.net/Handbook\\_ClimateRelatedInvesting.pdf](http://bcccc.net/Handbook_ClimateRelatedInvesting.pdf)). Issue of this document supports argument in this paper that the discourse of official climate policy has served to exclude the involvement of private institutional investors.

protect human communities from climatic change<sup>[47]</sup>. The absence of the five largest industrial sources of carbon, perfluorocarbon and nitrous oxide emissions (deforestation, production of chemicals and ammonia, and maritime and air transport) from emissions limitations underlines a need for appropriate relegation of the market as an organizing metaphor. Outcomes of eliding discourses are real. Polluting diesel generation is used as an unstable means of electricity supply in Nigeria while its gas fields, priced below an economic yield, are burnt.

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<sup>[47]</sup> The Global Environment Facility had cause to notice in 2009 that the announcement of the 2009 US federal science budget had not included donors' pledges. The decision cast USD6.1 billion in direct and tied pledges into doubt (Bjørnsen, in interview, 7 March 2009).

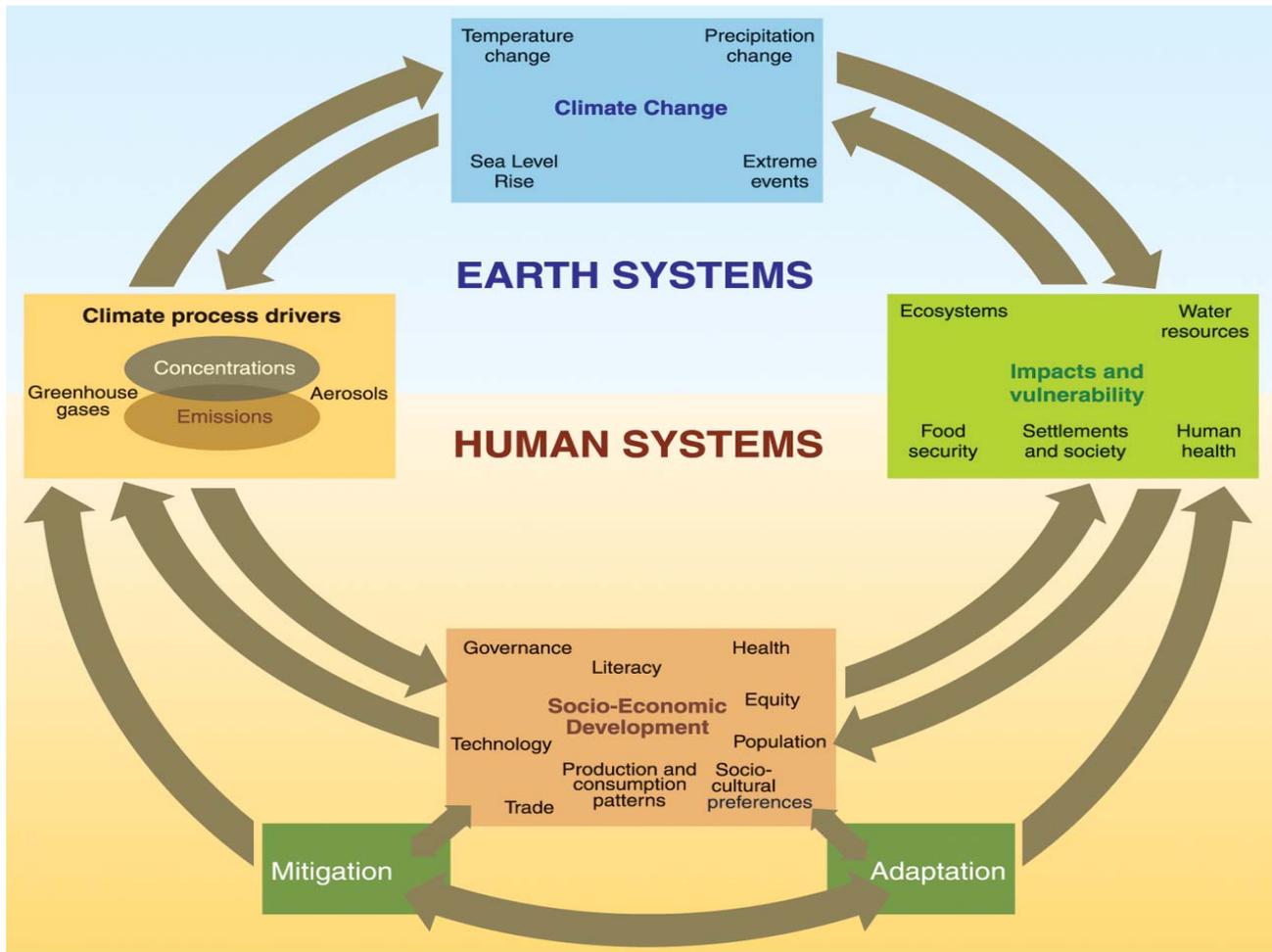
## LEGISLATIVE REFERENCES AND POLICY GUIDANCE

- European Parliament and the Council of the European Union. Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (Text with EEA relevance). Official Journal L 275, 25/10/2003 P. 0032-0046.
- European Parliament and the Council of the European Union. Directive 2004/101/EC of the European Parliament and of the Council of 27 October 2004 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms.
- European Parliament and the Council of the European Union. Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community.
- FCCC/TP/2008/5 (United Nations Framework Convention on Climate Control). 2008. Technical Paper 5, Approaches to monitoring and evaluation of capacity-building at different levels. Geneva.
- Guidance on Implementation of the Kyoto Protocol on Pollutant Release and Transfer Registers. Downloaded 8 March 2009, [http://www.unece.org/env/pp/prtr/guidance/PRTR\\_May\\_2008\\_for\\_CD.pdf](http://www.unece.org/env/pp/prtr/guidance/PRTR_May_2008_for_CD.pdf).
- IPCC (Intergovernmental Panel on Climate Change). 2007. Climate change 2007: synthesis report for policy makers. Geneva.
- Kyoto Protocol Reference Manual on accounting of emissions and assigned amounts. Downloaded 8 March 2009, [http://unfccc.int/resource/docs/publications/08\\_unfccc\\_kp\\_ref\\_manual.pdf](http://unfccc.int/resource/docs/publications/08_unfccc_kp_ref_manual.pdf).
- Kyoto Protocol, Conference of the Parties to the UNFCCC 4 of 1998. Downloaded 8 March 2009, <http://unfccc.int/resource/docs/convkp/kpeng.pdf>.
- United Kingdom Climate Change Act 2008. The Stationery Office Limited.
- 
- Baldvinsdottir, G., Burns, J., Nørreklit, H., and Scapens, R. W. 2009. The image of accountants: from bean counters to extreme accountants. *Accounting, Auditing & Accountability Journal*, forthcoming.
- Bernstein, A. 2008. Incorporating labor and human rights risk into investment decisions. Occasional Paper 2, Harvard Law School.
- Blachowicz, C. L. Z., Fisher, P. J. L., Ogle, D., and Watts-Taffe, S. 2006. Theory and research into practice: vocabulary: questions from the classroom. *Reading Research Quarterly*, 41(4): 524-539.
- Buchanan, R. 2001. Design and the new rhetoric: productive arts in the philosophy of culture. *Philosophy and Rhetoric* 34(3): 183-206.

- Bumpus, A. G., and Liverman, D. 2008. Accumulation by decarbonisation and the governance of carbon offsets. *Economic Geography*. In-press.
- Burns, C. 2000. Suturing over racial difference: problems for a colorblind approach in a visual culture. *Discourse*, 22(1): 70-91.
- Butler, C. 2000. Inequality, global change and the sustainability of civilization. *Human Health*, 1(2): 156-172.
- Butler, C. 2008a. Environmental change, injustice and sustainability. *Bioethical Inquiry*, In-press. Doi:10.1007/s11673-008-9078-5.
- Butler, C. 2008b. Sustainable health for all by the year 2100?. *International Journal of Public Health*, 53: 223-224.
- Bäckstrand, K., and Lövbrand, E. 2007. Climate governance beyond 2012: competing discourses of green governmentality, ecological modernization and civic environmentalism. In *Global Environmental Governance*, M. E. Pettenger (Ed.), pp. 123-148, Ashgate, Aldershot UK.
- Carbon Disclosure Project. 2009. Carbon disclosure leaders index 2008: Methodology overview 2008. Downloaded 15 April 2009, <http://www.cdproject.net/2009CDLImethodology.asp>.
- Capoor, K., and Amrosi, P. 2008. State and trends of the carbon market 2008. Downloaded 21 March 2009, [http://wbcarbonfinance.org/docs/state\\_trends\\_finale.pdf](http://wbcarbonfinance.org/docs/state_trends_finale.pdf).
- Clark, G. L., and Hebb, T. 2005. Why should they care? The role of institutional investors in the market for corporate global responsibility. *Environment and Planning A*, 37(11): 2015-2031.
- Crawford, C. 2009. The public, the private and the extra-legal: incentives, impediments and initiatives for managing growth and ensuring sustainable development. Paper presented at Beyond Kyoto: Addressing the Challenges of Climate Change, Aarhus.
- Eagleton, T. 1991. *Ideology*. Verso, London.
- Evans, M. 2001. Understanding dialectics in policy network analysis. *Political Studies*, 49: 542-550.
- Friel, S., Marmot, M., McMichael, A. J., Kjellstrom, T., and Vågerö, D. 2008. Global health equity and climate stabilisation: a common agenda. *The Lancet*, 372(9650), pp. 1677-1683.
- Füssel, H.-M., and Klein, R. J. T. 2006. Climate change vulnerability assessments: an evolution of conceptual thinking. *Climatic Change*, 75: 301-329.
- Hagerman, L. 2007. More than a profit? Measuring the social and green outcomes of urban investments. Working paper WP 07-17, 1-46. Oxford: Oxford University Centre for the Environment.
- Leiserowitz, A. 2006. Climate change risk perception and policy preferences: the role of affect, imagery, and values. *Climatic Change*, 77: 45-72.
- Levy, D., and Egan, D. 2003. A neo-Gramscian approach to corporate political strategy: conflict and accommodation in the climate change negotiations. *Journal of Management Studies*, 40(4): 803-830.

- Livesey, S. 2002. Global warming wars: rhetorical and discourse analytic approaches to ExxonMobil's corporate public discourse. *The Journal of Business Communication*, 39(1): 117-148.
- Lockhart, J. A. 2007. Environmental taxation: a tool to advance eco-justice?. In K. Dektelaere, J. E. Milne, L. Kreiser, H. Ashiabor (Eds.), *Critical Issues in Environmental Taxation, International and Comparative Perspectives, Volume IV*, pp. 491-513, Oxford University Press, New York.
- Lohmann, L. 2005. Marketing and making carbon dumps: commodification, calculation and counterfactuals in climate change mitigation. *Science as Culture*, 14(3): 203-235.
- Llewellyn, S., and Milne, M. 2007. Accounting as codified discourse. *Accounting, Auditing & Accountability Journal*, 20(6): 805-824.
- Markowitz, H. 1952. Portfolio selection. *Journal of Finance*, 7: 77-91.
- Markowitz, H. 1971. *Portfolio Selection: Efficient Diversification of Investments*, John Wiley & Sons, New York.
- Okereke, C. 2007. An exploration of motivations, drivers and barriers to carbon management: the UK FTSE 100. *European Management Journal*, 25(6): 475-486.
- Oreskes, N. 2004. The scientific consensus on climate change. *Science*, 306 (5702): 1686.
- Owen, D. L. 1990. Towards a theory of social investment: a review essay. *Accounting, Organizations and Society*, 15(3): 249-65.
- Owen, D. L. 2008. Chronicles of wasted time? A personal reflection on the current state of, and future prospects for, social and environmental accounting research. *Accounting, Auditing & Accountability Journal*, 21(2): 240-267.
- Pettenger, M. E. 2007. Introduction. In *Global Environmental Governance*, pp. 1-22, Ashgate, Aldershot UK.
- Readence, J. R. and Searfoss, L. W. 1980. Teaching strategies for vocabulary development. *The English Journal*, 69(7): 43-46.
- Sarra, J. 2008. Credit derivatives market design, creating fairness and sustainability. Unpublished working paper, University of British Columbia.
- Stern, N. 2008. *Key Elements Of A Global Deal On Climate Change*. The London School of Economics and Political Science, London.
- Vanderslice, R. and Ladefoged, P. 1972. Binary suprasegmental features and transformational word-accentuation rules, *Language*, 48(4): 819-838.
- Vološinov, V. N. 1986. *Marxism and the Philosophy of Language*. Trans. M. Ladislav and I. R. Titunik. Seminar Press, MI.

Exhibit 1: United Nations Framework Convention on Climate Control



Source: Schematic framework of anthropogenic (human-induced) climate change drivers, impacts and responses, <http://www.ipcc.ch/graphics/graphics/syr/figi-1.jpg>. Selected from the Synthesis Report, [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf). The image also appears in a Technical Summary report, [http://www.ipcc-wg1.ucar.edu/wg1/report/ar4wg1\\_print\\_ts.pdf](http://www.ipcc-wg1.ucar.edu/wg1/report/ar4wg1_print_ts.pdf). All documents downloaded 8 March 2009.

Exhibit 2: The Carbon Trust



Source: [http://www.carbonfund.org/site/pages/individuals/individual\\_business\\_carbon\\_offsets](http://www.carbonfund.org/site/pages/individuals/individual_business_carbon_offsets);  
<http://www.carbonfund.org/calculators>;  
[http://www.carbonfund.org/site/pages/our\\_projects/category/Verification](http://www.carbonfund.org/site/pages/our_projects/category/Verification),  
[http://www.carbonfund.org/site/pages/land/enter\\_a\\_donation\\_amount](http://www.carbonfund.org/site/pages/land/enter_a_donation_amount). All images downloaded 20 February 2009.

Figure 1: Carbon Disclosure Project

Company	Sector	No. companies in sector	CDLI score (%) (ranked within sector)	Carbon intensity* (ranked within sector)	Direct emissions** (ranked within sector)
BASF	Chemicals	9	82 (1 <sup>st</sup> )	346 (7 <sup>th</sup> )	23463 (8 <sup>th</sup> )
Nissan Motor	Construction	4	78 (1 <sup>st</sup> )	30 (1 <sup>st</sup> )	975 (2 <sup>nd</sup> )
Suncor	Oil and gas	5	75 (1 <sup>st</sup> )	588 (4 <sup>th</sup> )	10419 (1 <sup>st</sup> )
BHP Billiton	Mining	7	77 (1 <sup>st</sup> )	1096 (4 <sup>th</sup> )	21394 (4 <sup>th</sup> )
Iberdrola	Transport	9	82 (1 <sup>st</sup> )	1616 (7 <sup>th</sup> )	37769 (7 <sup>th</sup> )
Barclays	Financial	18	98 (1 <sup>st</sup> )	11 (13 <sup>th</sup> )	31 (9 <sup>th</sup> )
Taiwan Semiconductor	Hospitality	4	95 (1 <sup>st</sup> )	439 (3 <sup>rd</sup> )	2466 (3 <sup>rd</sup> )
Tesco	Retail	7	96 (1 <sup>st</sup> )	42 (3 <sup>rd</sup> )	1705 (5 <sup>th</sup> )
EMC	Media	5	98 (1 <sup>st</sup> )	20 (4 <sup>th</sup> )	32 (2 <sup>nd</sup> )

Source: Data are selected from CDLI 2008. Downloaded 20 April 2009, <http://www.cdproject.net/carbon-disclosure-leadership-index.asp>. Sectors shown correspond to the industrial sectors of the Financial Times Global 500 index.

\*Calculation of ‘carbon intensity’ uses volumes of direct carbon emissions deflated by company-global or -sectoral revenues for the 2008 financial year. Rankings indicate the ‘carbon intensity’ of companies relative to that sector, where 1<sup>st</sup> corresponds to the best carbon performance in that sector.

\*\*Direct emissions are based on quoted volumes of CO<sub>2</sub>-equivalent tonnages for the 2008 financial year. Individual rankings indicate emissions relative to that sector, where 1<sup>st</sup> corresponds to the best carbon performance in that sector.

Figure 2: Carbon Disclosure Project regression analysis

	(1) CDLI ranking	(2) CDLI score	(3) CDLI score
carbon emissions ranking	-0.234** (0.0851)		
carbon emissions		-0.000129*** (0.0000226)	-0.00000927 (0.0000309)
constant	6.171*** (1.040)	73.02*** (1.098)	82.62*** (3.604)
Industry dummies	Yes	No	Yes
N	231	230	230
R-sq	0.391	0.066	0.287
F-stat	27.09	32.71	11.55

White's robust standard errors in parentheses  
 \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Figure 3: Distinctive feature matrix

	IPCC	CT*	CDP
Composition [comp] + / -	+	-	-
Presentation [+pres] [-presr] [-presa]	-presa	+pres	-presr
Argumentation [argu] [-argus] [-argug]	+argu	-argug	-argug
Loaded vocabulary [loco] + / -	-	-	+
Schemes of words [scheme] + / -	+	+	+
Voice [voice] + / -	-	+	-
Modality [mode] + / -	-	-	+
Grammatical mood [mood] + / -	-	+	+
Visual rhetoric [vis] + / -	+	+	+

\*CT=The Carbon Trust.

\*\*[loco]. IPCC=progressive solution; CT=consumerist solution; CDP=balanced risk/revenue solution.

Figure 4: Summary of feature matrix

	Composition, presentation, argumentation, vocabulary, schemes, voice, modality, mood, visual
Climate science discourse	+, [-presa] , [+argu] , -, + , - , - , - , +
Policy makers' discourse	-, [+pres] , [-argug] , - , + , + , - , + , +
Financial services discourse	-, [-presr] , [-argug] , + , + , - , + , + , +