How do companies participating in voluntary initiatives report their climate change performance?

Edeltraud Guenther, Martin Nowack and Gabriel Weber

Technische Universität Dresden

Chair for Environmental Management

01062 Dresden, Germany

www.tu-dresden.de/wwwbwlbu/en

bu@mailbox.tu-dresden.de

Telefon: +49 351 463-34313, Telefax: +49 351 463-37764

Edeltraud Guenther is Professor of Environmental Management, Technische Universität Dresden (TUD) and Visiting Professor of Commerce at the University of Virginia (USA). Her research interests are environmental performance measurement (for products and processes); value relevance of environmental resources for companies; environmental procurement; and the deceleration of consumption and production processes.

bu@mailbox.tu-dresden.de

Martin Nowack studied Economics at Free University of Berlin and Université Pierre Mendes France, Grenoble (France). He is currently conducting research on means of corporate management under the constraints of climate change policy (CO_2-NAVIGATOR). In addition, he assesses impacts of demographical change on the drainage of settlements.
Martin.Nowack@tu-dresden.de

Gabriel Weber studied business administration at the University of Applied Sciences Berlin and environmental management at Free University of Berlin. His research interests lay in the field of corporate management in a climate change environment. Furthermore he is currently conducting research on means of evaluating the use of operating room textiles, economically and environmentally.

Gabriel.Weber@tu-dresden.de

Recently many business networks relating to climate change were established. Popular examples are Combat Climate Change (3C) initiative, US-CAP, and WWF's Climate Savers. The 3C business network is showing leadership by demanding an integration of climate issues into the world of markets and trade facilitated by means of a global framework. A majority of signatory companies generate electricity or are related to energy supply. The electricity sector in particular is characterized by the interaction of social and ecological dimensions and closely coupled with climate change as a severe ecological problem that require decades rather month or years to be abated. However, irrespective of the dominating sector, business networks can be seen as a response to climate change.

This paper categorises the different business networks adapting to climate change. Classifying items will be inter alia member companies, dominating sector, launching organisation, geographical scope, and objectives. Especially the business network companies' communication of climate change efforts will be assessed. The research question is, whether a membership in a network has an impact on corporate efforts and communication relating to climate change in terms of quality or quantity. Hence annual sustainability reports, published by network companies that followed Global Reporting Initiative's (GRI) Sustainability Reporting Guidelines were analysed. The GRI-guidelines take into account environmental performance indicators relating to greenhouse gas emissions (G3: EN16, EN17, EN18, GRI2002: EN 8, EN 30).

By analysing the GRI-indicators relating to climate change it is considered what outcomes have been achieved in terms of adapting to climate change and how do they vary in the different networks. Furthermore it is examined how network companies' respond to the long-term dimension of climate change and what actions have been taken in response to pressures from stakeholders. Also it is investigated whether these actions resulted in significant reductions in greenhouse gas emissions hitherto.

Keywords: Global reporting initiative
Environmental reporting
Corporate social responsibility
Climate change disclosure
Climate Risk
3C Combat Climate Change
WWF's Climate Savers
U.S. Climate Action Partnership (US-CAP)
Corporate Networks
Corporate climate initiatives
Electricity industry
Environmental indicators
Content analysis
Survey

1 Introduction

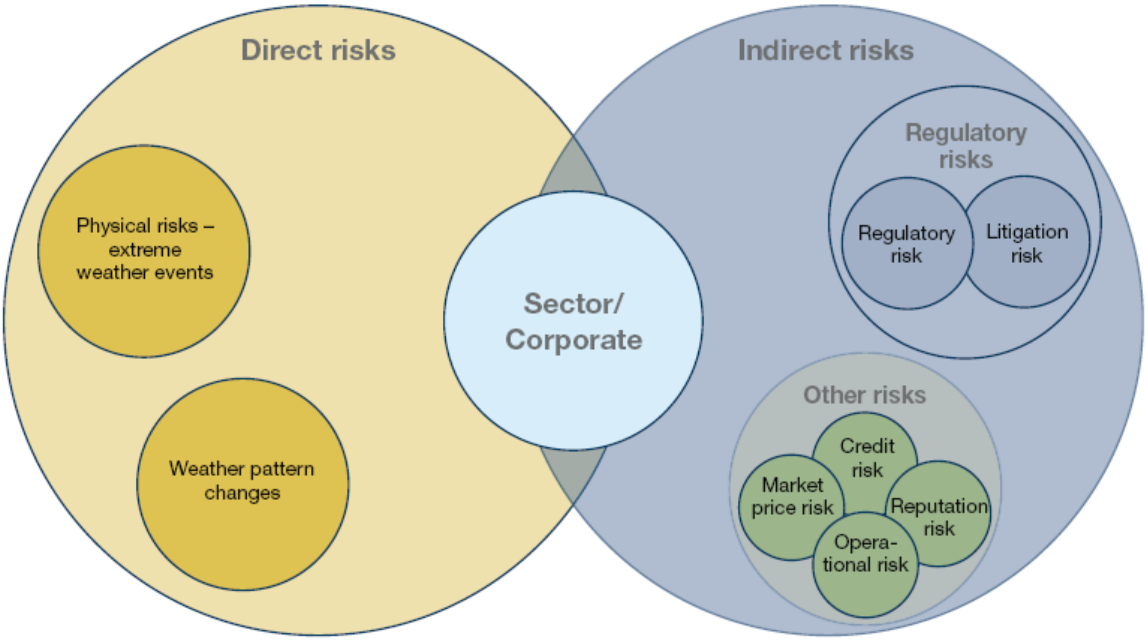
Environmental reporting, today part of sustainability reporting, has developed significantly during the past few decades. As an aspect of CSR, it is nowadays a common practice for many companies, including the energy sector (Kolk et al. 2005: 12), to demonstrate an active initiative towards the promotion of sustainable development. A vital step in this development was the formation of the Global Reporting Initiative (GRI) project, which was started in 1997 by the Centre for Education and Research in Environmental Strategies (CERES), a network of investors and environmental organisations which wanted to bring a new perspective to business decisions by integrating societal concerns, natural resources and biological systems issues. In doing so, they did an important step for establishing a common framework for environmental reporting. Meanwhile the Global Reporting Initiative has developed guidelines in order to promote responsible decision-making in companies, but also in order to get a comparable information base for interested parties. So the target groups of the GRI are internal and external as well. The first guidelines were published in 2000, followed in 2002 by a second version (GRI 2002) and a revised third version (G3) in 2006. Today, many companies actively apply the guidelines when compiling their reports. There is not yet, however, any considerable insight into the specific level of application of the guidelines. This contribution attempts to assess the extent to which the energy sector follows the GRI guidelines, bringing the extent to which the climate change related indicators proposed by GRI are applied.

This contribution comprises four six parts. After the introduction the second chapter presents climate risks as a good way for companies to assess the impacts of climate change. Climate initiatives as an instruments for reducing climate risks are introduced in chapter 3. In the following (chapter 4) describes corporate climate initiatives such as 3C, US-CAP and WWF's Climate Savers. In the fourth chapter a short description of GRI and an outline of the methodology applied is accomplished. In the fifth chapter the GRI-analysis is deepened by analyzing the sustainability and risk reports of E.ON, Vattenfall and EnBW (3C signatory companies) in more detail. In the last part the chapter the vital conclusions will be drew.

2 Climate Risks

In a carbon constraint world, climate change is confronting corporations with totally new challenges. One way to deal with the impacts of climate change is to comprehend them as risks. The ISO/IEC Guide 73 (ISO 2002) defines risk as "the combination of the probability of an event and its consequences." Therefore climate risks could be defined as the possible impacts of climate change with the potential to influence positively or negatively the future development of a company or organization.

Figure 1: Categorization of climate risks (Source: CDP 2007)



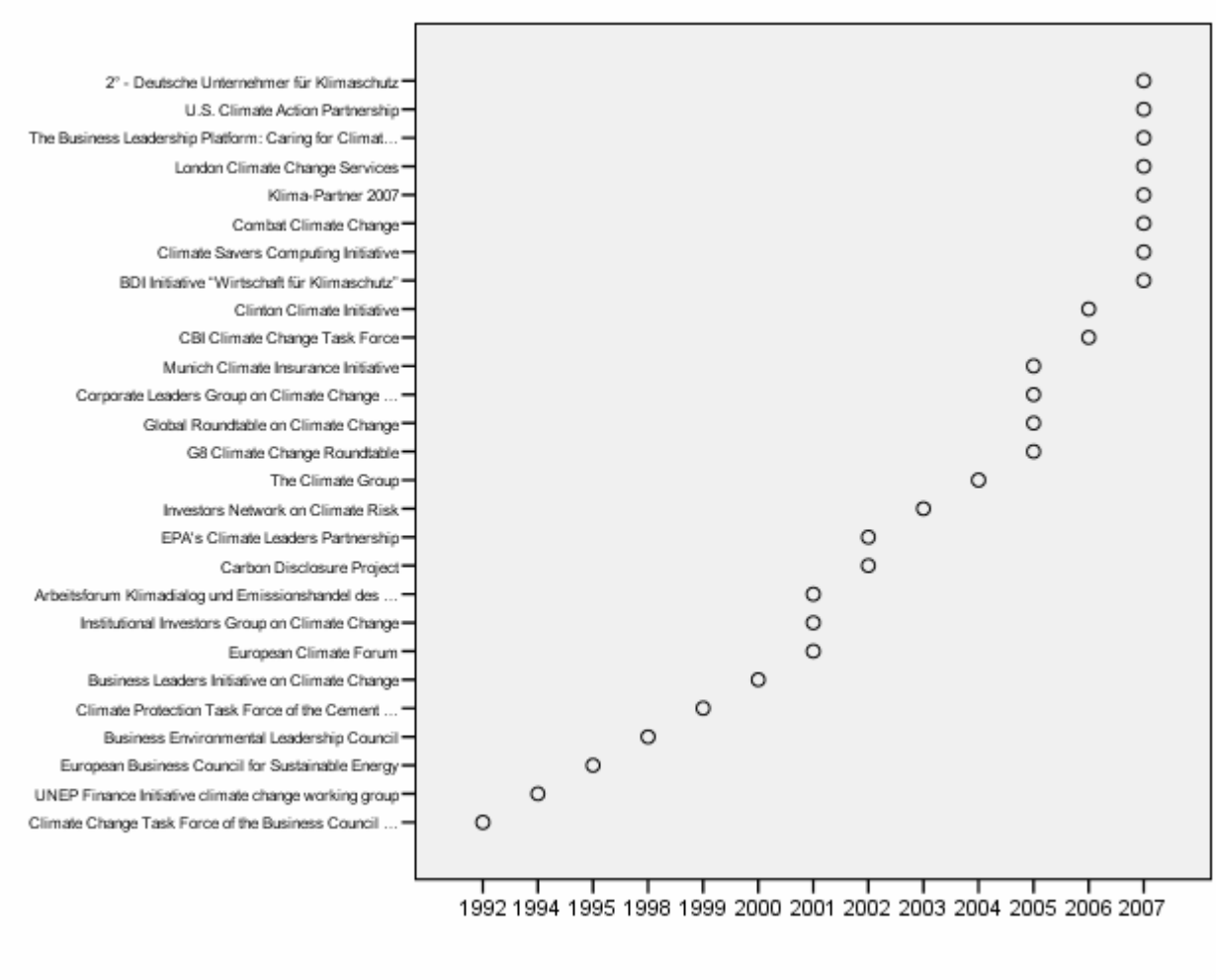
The risks from climate change can be classified, as direct or indirect. Direct climate risks are resulting out of changing natural conditions as rising temperatures, sea levels or an increasing number of extreme weather events. Indirect climate risks seems to have much more implications than the direct ones. Wellington and Sauer (2005) also underline that "Uncertainty on climate change is related mainly to the policy framework under which greenhouse gases will be regulated." Especially for a better management of regulatory climate risks networking seems to be a good instrument to deal with this kind of climate risks. The foundation or the participation in corporate climate initiatives could help to anticipate and to influence future regulatory frameworks.

3 Corporate climate initiatives

Corporate climate initiatives can be defined as voluntary associations of companies responding proactive to the business challenges of climate change.

In the last two decades the foundation of an increasing number of such climate initiatives could be observed by the authors. As illustrated in figure 2, since 1999 every year a new climate initiative has been set up. In the years 2001 and 2005 more than three initiatives started to engage actively in climate change. The peak was reached in 2007 with eight newly established initiatives.

Figure 2: Foundation of corporate climate initiatives



The initiative are partly wholly new networks and partly build up on existing networks. The United Nations Environmental Program (UNEP) Finance Initiative for example initiated a new working group exclusively focussing on climate change. The Business Council for Sustainable Energy set up a climate change task force as well as the German Federation of Industry. In other initiatives such as the U.S. Climate Action Partnership or the 3C- Combat Climate Change initiative corporate members build up a new network without the help of existing structures.

Roughly one third of the initiatives consists only of companies. The bigger part of initiatives is a combination of at least two different types of members such as companies with research institutes, nongovernmental organisations (NGO) or government bodies.

WWF's Climate Savers Program, 3C-Combat Climate Change and the U.S. Climate Action Partnership (US-CAP)

In the following the authors focus on the analysis of the three initiatives: WWF's Climate Savers Program, 3C-Combat Climate Change and the U.S. Climate Action Partnership (US-CAP).

The WWF's Climate Savers Program was started in 2000 with three companies: IBM, Johnson & Johnson and Polaroid. The membership in this program is linked to ambitious targets to reduce the companies' CO2-emissions. The NGO serves in this case as a trusted third party and helps the company to stand out from enterprises who misuses the risen public awareness concerning climate change for marketing reasons. In 2007 the initiative counts twelve participating companies (Johnson & Johnson, IBM, Nike, Polaroid, Collins, Xanterra, Sagawa, Sony, Lafarge, Catalyst, Tetra Pak, und Novo Nordisk). The initiative underlines the possibilities and responsibility of corporation in combating climate change.

> *"At the Climate Savers Conference in February 2007 companies and WWF showed that they are on course to eliminate at least ten million tons of CO_2 emissions annually by 2010. If an additional 1,300 large companies join them, current emission reduction targets set out in the Kyoto Protocol could be achieved." WWF (2007)*

The 3C Combat Climate Change Initiative was founded in January 2007 and has currently 49 members. The Swedish power company Vattenfall was the initiator and is still responsible for the coordination of the initiative. 3C is explaining its goal as following:

> *"The goal is to underline the need for urgent action by the global community and to influence the post-Kyoto process by demanding a global framework supporting a market based solution to the climate change issue. This can be achieved by getting as many companies as possible aboard and by getting our common platform well known and well understood."(Combat Climate Change 2007a)*

The initiative consists of two supporting organisations: the Club de Madrid and the World Business Council for Sustainable Development and 49 member companies mainly out of the energy sector[1]:

> *ABB, AIG, Alcan, Alstom, Areva, Bayer, BP, British Sky, Centrica, CEZ Group, China National Offshore Oil Corp., Citigroup, Corus, Deutsche Bahn AG, Deutsche Post World Net, DONG Energy, Dow Chemical, Duke Energy, Endesa, EnBW, Enel, E.ON, Eskom, Fortum, GE, Hitachi, Iberdrola, Lufthansa, MAN, Munich Re Group, MVM Zrt., Norske Skog, NRG Energy, Nuon, Otto Group, PG&E Corporation, PNM Resources, RAO UES of Russia, Reuters, SAP AG, SAS Group, Siemens, Suez, Tata Power Company Ltd, TAQA, Abu Dhabi National Energy Company, Vattenfall, Veolia, Volvo, Wallenius Lines*

The most important outcome of the initiative is the roadmap to combate climate change (Combat Climate Change 2007b) and the 3C Statement (Combat Climate Change 2007c). The request for a global climate framework underlines the political character of the 3C-Initiative. Instead of setting any common reduction objectives the member companies call on the international community to set these targets. Nevertheless the initiative denotes its corporate members climate *"business leaders"*. The question is if the business leaders are also leaders in so

[1] Status quo in January 2008.

managing the issue of climate reporting. This will be analysed in the fourth chapter using the guidelines of the Global Reporting Initiative (GRI).

The U.S. Climate Action Partnership (US-CAP) was founded in 2007 by a group of U.S.-based businesses and leading environmental organizations. Its 36 members are: Alcan Inc., Alcoa, American International, Group, Inc. (AIG), Boston Scientific Corporation, BP America Inc., Caterpillar Inc., ConocoPhillips, The Chrysler Group, Deere & Company, The Dow Chemical Company, Duke Energy, DuPont, Environmental Defense, Exelon Corporation, Ford Motor Company, FPL Group, Inc., General Electric, General Motors Corp., Johnson & Johnson, Marsh, Inc., National Wildlife Federation, Natural Resources, Defense Council, NRG Energy, Inc., The Nature Conservancy, PepsiCo, Pew Center on Global Climate Change, PG&E Corporation, PNM Resources, Rio Tinto, Shell, Siemens Corporation, World Resources Institute and the Xerox Corporation. In their common report "A call for Action" they call mainly for a strong legislation to achieve significant reductions of greenhouse gas emissions in the United States (US-CAP 2007).

Looking closer at the participating companies of the three climate initiatives:3C, WWF's Climate Savers and US-CAP (see table 1) the dominating sectors are clearly the electricity, oil & gas and the multi utilities. Looking for the origin of the participating companies Europe denotes the biggest part of the participating companies. On the country level the United States are playing the most important role. The most active companies are Duke Energy Corporation, General Electric Company, Johnson & Johnson, PG&E Corporation, The Dow Chemical Company and Alcan Inc. These companies participate in two climate initiatives.[2]

[2] The categories of this analysis (sector etc.) coincidee with the GRI datasets.

Table 1: Corporate Members of 3C, Climate Savers and US-CAP.

Company Name	3C	Climate Savers	USCAP	Sector	Country
AB Volvo	1	0	0	Automobiles & Parts	Sweden
ABB Ltd	1	0	0	Electronic & Electrical Equipment	Switzerland
Alcan Inc	1	0	1	Steel & Other Metals	Canada
Bayer AG	1	0	0	Pharmaceuticals & Biotechnology	Germany
BP plc	1	0	0	Oil & Gas	UK
British Sky Broadcasting Groupe	1	0	0	Media & Photography	UK
BSH Bosch und Siemens Hausgeräte GmbH	1	0	0	Household Goods & Textiles	Germany
Catalyst Paper Corporation	0	1	0	Forestry & Paper	Canada
Centrica plc	1	0	0	Gas Distribution	UK
Citigroup	1	0	0	Banks	USA
ConocoPhillips	0	0	1	Oil & Gas	USA
Corus	1	0	0	Steel & Other Metals	UK
Deutsche Bahn AG	1	0	0	Transport	Germany
Deutsche Lufthansa AG	1	0	0	Transport	Germany
Deutsche Post World Net	1	0	0	Support Services	Germany
DONG Energy AS	1	0	0	Electricity	Denmark
Duke Energy Corporation	1	0	1	Electricity	USA
E.ON AG	1	0	0	Multi Utilities	Germany
Endesa SA	1	0	0	Electricity	Spain
Enel SpA	1	0	0	Electricity	Italy
Energie Baden-Württemberg AG (EnBW)	1	0	0	Multi Utilities	Germany
Eskom Holdings	1	0	0	Electricity	South Africa
Ford Motor Company	0	0	1	Automobiles & Parts	USA
Fortum Corporation	1	0	0	Oil & Gas	Finland
General Electric Company	1	0	1	Diversified Industrials	USA
Hitachi Ltd	1	0	0	Information Technology Hardware	Japan
Iberdrola SA	1	0	0	Electricity	Spain
International Business Machines Corporation (IBM)	0	1	0	Information Technology Hardware	USA
Johnson & Johnson	0	1	1	Pharmaceuticals & Biotechnology	USA
Lafarge SA	0	1	0	Construction & Building Materials	France
MAN AG	1	0	0	Engineering & Machinery	Germany
Nike Inc	0	1	0	Household Goods & Textiles	USA
Norske Skogindustrier ASA	1	0	0	Forestry & Paper	Norway
Novo Nordisk A/S	0	1	0	Pharmaceuticals & Biotechnology	Denmark
nv Nuon	1	0	0	Electricity	The Netherlands
Otto GmbH & Co KG	1	0	0	General Retailers	Germany
Pepsico Inc	0	0	1	Beverages	USA
PG&E Corporation	1	0	1	Multi Utilities	USA
Rio Tinto plc	0	0	1	Mining	UK
Royal Dutch Shell plc	0	0	1	Oil & Gas	The Netherlands
Siemens Ltd (Brasil)	1	0	0	Information Technology Hardware	Brazil
Suez	1	0	0	Support Services	France
Tetra Pak Group	0	1	0	Packaging	Belgium
The AREVA Group	1	0	0	Electricity	France
The Dow Chemical Company	1	0	1	Chemicals	USA
The SAS Group	1	0	0	Transport	Sweden
Unified Energy System of Russia (RAO)	1	0	0	Electricity	Russian Federation
Vattenfall AB	1	0	0	Electricity	Sweden
Veolia	1	0	0	Support Services	France

4 Global Reporting Initiative (GRI)

The analysis of climate change reporting in this paper focuses on companies being a member of at least one of the three climate initiatives 3C, USCAP and WWF Climate Savers for the year 2006. We analysed the reporting of the two environmental indicators of GRI 2002 (EN 8: Greenhouse gas emissions and EN 16: Total direct and indirect greenhouse gas emissions by weight) and three environmental indicators (EN 30: Other relevant indirect greenhouse gas emissions, EN 17: Other relevant indirect greenhouse gas emissions by weight and EN18: Initiatives to reduce greenhouse gas emissions and reductions achieved) plus one economic indicator of G3 (EC2: Financial implications and other risks and opportunities for the organization's activities due to climate change). An indicator is a measure of performance, either quantitative or qualitative. The GRI guidelines distinguish between core and additional indicators (for a detailed description of the 16 core and 19 additional environmental indicators of GRI 2002 see GRI (2002: 48ff)). The analysed indicators EN8 (GRI 2002) and EN16, EN17 and EC2 (G3) are core indicators, whereas EN30 (GRI 2002) and EN18 (G3) are additional indicators.

Focusing on the quantity and the quality of climate change reporting, this paper considers the following two research questions: 'What are companies reporting on climate change?' in line with the criteria in Deegan (2002) and 'In which quality are companies reporting on climate change?' (Willis 2003). The analysis focuses on voluntarily produced sustainability reports, published by companies belonging to the climate initiatives 3C, USCAP and WWF Climate Savers and following the GRI 2002 or G3 guidelines. The samples are gathered from the GRI Register hosted by CorporateRegister[3]. Its categorisations of the reports regarding the publication year, the industry membership and the version of the GRI guidelines were assumed by the authors. CorporateRegister was established in 1998 and is now the largest source for non-financial reports. Some 55 reports (6 companies are members of more than one initiative) from companies in the 3C initiative (37 companies), from the USCAP initiative (11 companies) and from the WWF climate savers initiative (7 companies) were analysed from the database for the year 2006.[4] For the 3C initiative a comparison over time for the years 2002 to 2006 was made.

The method used for answering the research questions is a quantitative (chapter 4) and qualitative content analysis (chapter 5). For chapter 4 a categorisation scheme based on the two (GRI 2002) resp. four (G3) climate change indicators provided by the GRI-guidelines was used: First, the quantity of the required indicators was assessed using the categorisation 'reported' or 'not reported'. Second, the quality of reporting was evaluated. If an indicator was reported, the quality of the reporting style was assessed with a classification of 'partially reported' and 'completely reported'. An indicator is referred to as 'completely reported',[5] if all the information required by GRI 2002 resp. G3 was provided. An indicator is scored as 'partially reported' if at least one of the required components was found in the report. Otherwise the indicator is scored as 'not reported'. This also applies to the use of charts that cannot be interpreted because of missing or unclear items. As the analysis presented in this article is part

[3] CorporateRegister website, www.corporateregister.com/gri.
[4] A complete list of the companies is available on request from the authors.
[5] An indicator is also regarded as completely reported if a company gives a sound reason for not-reporting (e.g. not relevant for the industry).

of a larger research project, the rules governing decisions will be subject to a continuous process of improvement.

Derived from the literature presented above, five questions were leading for the analysis of the reports:

1. Is there a quantity–quality discrepancy in the climate change indicators?
2. Is there a difference between the different climate change indicators?
3. Is there a difference in reporting between the companies from the different initiatives?
4. Is there an impact of the versions of the guidelines?
5. Can there be a trend observed concerning the development of the quantity and quality of reporting for the 3C initiative over the years?

In total 55 corporate reports were analysed.

Figure 3:Quality and quantity for the climate change indicators

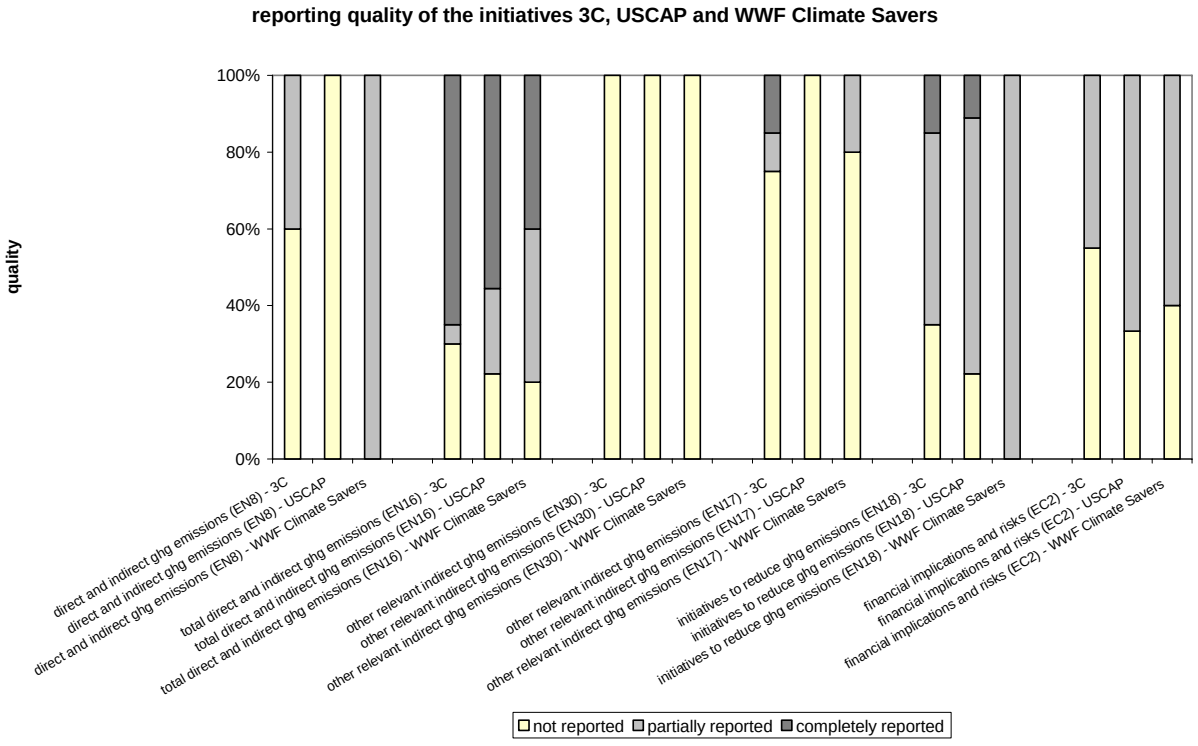
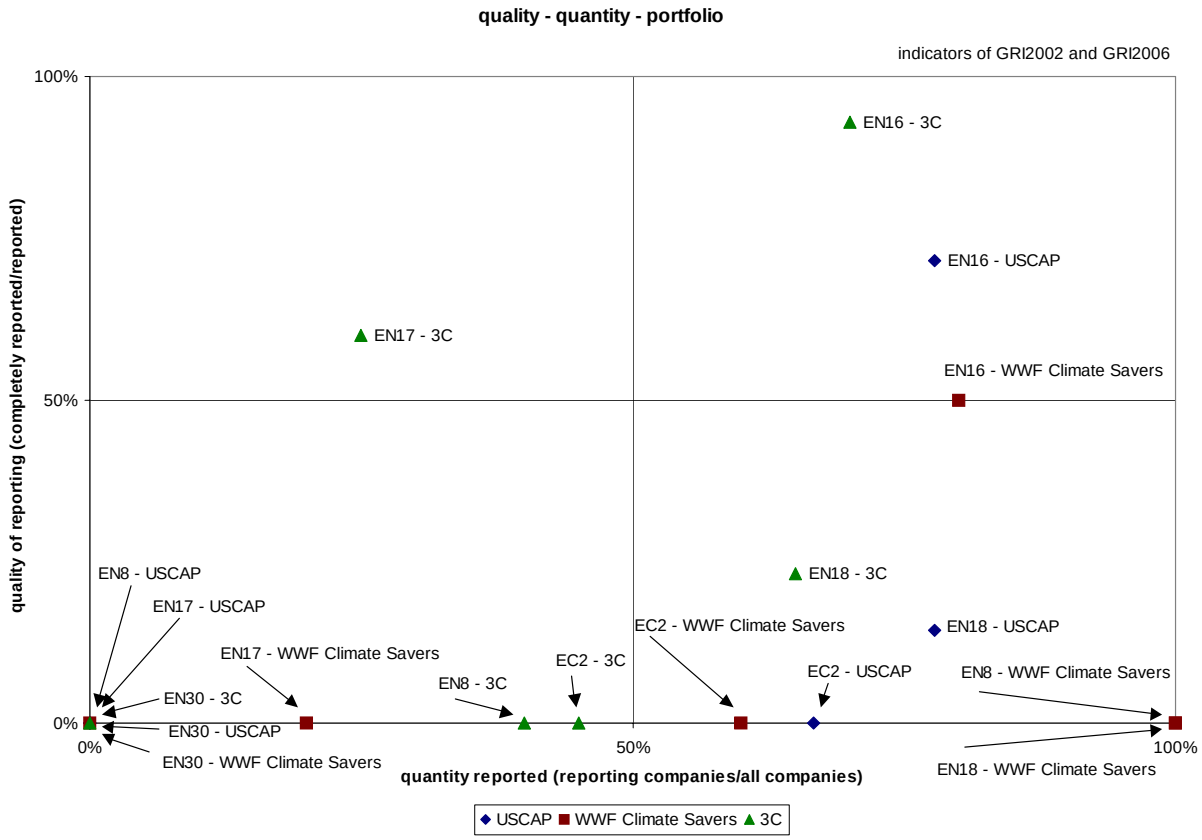


Figure 3 shows the reporting quantity (Is the indicator reported at all, i.e. is it reported partially or completely?) and the reporting quality (Does the reported indicator fulfil the rules set up in the indicator protocols, i.e. if reported, is the indicator reported completely?) of the companies from the three initiatives. For the direct and indirect GHG emissions (GRI 2002: indicator EN8 and G3: indicator EN 16) two interpretations can be made: a) the difference in reporting between the three initiatives is extremely diverse. As the companies just formed the initiatives to deduct conclusions would not be too early. b) there is an impact of the new guidelines G3 concerning the quantity and the quality of the indicators reported. This might be due to the fact that the interpretation of the indicator is easier and less misleading for the companies.

For other relevant indirect GHG emissions (EN30) the impact of the new guidelines G3 can be perceived, too. Indicator EN18 in G3 describing the initiatives to reduce GHG emissions, is a new indicator, so no trend can be derived. But it can be attested that the indicator had a fulminant start. As only a few companies report the indicator completely, there might be difficulties in interpretation, but it also might be due the fact that the indicator is new and the companies have to gain experience how to use it. EC2 "Financial implications and other risks and opportunities for the organization's activities due to climate change", also a newly introduced indicator is described by just over 50% to some extent. Comparing the different climate change indicators, it can be seen, that the main indicators EN8 resp. EN16 are reported in a higher quantity and quality than the other indicators. As they are ranked as core indicators, whereas the others are categorised as additional indicators this result could be expected.

In order to visualise the differences in reporting between the indicators reported, a quantity-quality portfolio can be used. In order to determine the quantity of reporting, all reported indicators, completely or partially, were counted. To measure the quality of reporting, only those indicators being reported completely were counted. So the quality expresses the degree of compliance with the indicator protocols. In the portfolio the 18 indicators[6] (2 GRI2002-indicators, 4 G3-indicators for 3 initiatives in each case) in analysed can be positioned and paths of their development can be derived.

Figure 4: Quality-quantity portfolio



Using the 50%-axes as separation lines, four quadrants were defined for the portfolio (Guenther, Hoppe and Poser 2007)

[6] As the guidelines changed in 2006 the indicators EN 8 and EN 30 in 2006 are not integrated in the paths in order to avoid biases.

- high quantity/high quality: easy to collect and/or important information
- high quantity/low quality: difficult to collect in the demanded quality
- low quantity/high quality: mainly qualitative indicators that are easy to collect in the demanded quality, not reported deliberately or hard to assess
- low quantity/low quality: impossible to collect or to decipher the information

The analysis of the climate change indicators´ portfolio for the companies in the initiatives reveals that only one indicator, namely EN16 'direct and indirect GHG emissions' in 2006 is located in the upper-right quadrant, i.e. features a high quantity and quality of reporting. As only few companies still follow the older version of the guidelines the quantity shall not be interpreted, but for the quality the impact of G3 can be seen. In addition, public awareness of climate change has grown, so reporting greenhouse gases has become a 'must'. This might explain the high quantity of companies reporting this indicator, too. The new version of the guidelines G3 led to an increase in the degree of compliance. For EN17 however, the quantity is not as high. EN 18 hat a good start concerning quantity, whereas quality has to be improved, still. Last not least, EC2 also had a good start in quantity terms, quality is still ranked low as well. This can be owed to the fact, that the indicators are classified by the GRI guidelines as additional, whereas EN16 are scored as core indicators.

5 Climate change disclosures of Vattenfall, E.ON and EnBW

After verifying the conformity of the companies' GRI reports with the climate change related GRI indicators the further analysis focuses on the climate change disclosures of 3C members Vattenfall, E.ON and EnBW. Within a holistic approach environmental reports as well as risk reports of Vattenfall, E.ON and EnBW are analysed. As multi utility respectively electricity companies they represent the dominating sector of the 49 companies. Vattenfall AB based in Stockholm, is a Swedish power company and one of the major energy producers in Northern Europe. Vattenfall is entirely owned by the Swedish government. In Germany, Vattenfall is the electric utility for the states of Hamburg, Mecklenburg-Vorpommern, Brandenburg, Berlin, Saxony-Anhalt, Thuringia, and Saxony. E.ON AG based in Düsseldorf, Germany, is an energy corporation, one of the 30 members of the DAX stock index of major German companies. EnBW Energie Baden-Württemberg AG, or merely EnBW, is a publicly traded electric utilities company headquartered in Karlsruhe, Germany. The two major shareholders of EnBW are Électricité de France (EDF), and Oberschwäbische Elektrizitätswerke (OEW), both with a 45% share.

5.1 Climate change disclosure within in environmental reporting

Consistently with the assessment of the GRI conformity the following analysis take the GRI guidelines as a point of reference for climate change disclosure. In total there are four GRI reports from Vattenfall accounting the years 2003 to 2006, one report from EnBW (2004) and two reports from E.ON (2005 and 2006) as table 2 shows. E.ON's 2004 report as well as EnBW's 2005/ 2006 report[7] are not in the GRI guidelines register although referring to the GRI guidelines. EnBW's 2003 report is not related to the GRI guidelines.

[7] EnBW did not publish a sustainability report for 2006 but one for 2005 and 2006.

Table 2: Climate change disclosures in environmental reporting

	Vattenfall	**E.ON**	**EnBW**
2003	**GRI report (2002)**	**No report**	**No GRI report**
Direct and indirect GHG emissions: (EN8)	Partially (only CO_2)	-	Not reported
Other relevant indirect GHG emissions: (EN30)	Not reported	-	Not reported
2004	**GRI report (2002)**	**No GRI register report**	**GRI report (2002)**
Direct and indirect GHG emissions: (EN8)	Partially (only CO_2)	Partially (only CO_2)	Partially (only CO_2, SF6)
Other relevant indirect GHG emissions: (EN30)	Not reported	Not reported	Not reported
2005	**GRI report (2002)**	**GRI report (2002)**	**No GRI register report**
Direct and indirect GHG emissions: (EN8)	Partially (only CO_2)	Partially (only CO_2)	Partially (only CO_2, SF6)
Other relevant indirect GHG emissions: (EN30)	Not reported	Not reported	Not reported
2006	**GRI report (2002)**	**GRI report (G3)**	**No GRI register report**
Direct and indirect GHG emissions: (EN8/ EN16))	Partially (only CO_2)	Completely (CO_2 equivalent)	Partially (only CO_2, SF6)
Other relevant indirect GHG emissions: (EN30/ EN17))	Not reported	Not reported	Not reported
Initiatives to reduce GHG emissions (EN18)	Partially (no sufficient quantification)	Partially (no sufficient quantification)	Not reported
Financial implications due to climate change (EC2)	Not reported	Partially	Partially

As the table 2 shows in the years 2003 to 2005 none of the companies' reports "direct and indirect CO_2 emissions" (EN8) completely. The GRI 2002 guidelines require separate subtotals for each gas in tonnes and in tonnes of CO_2 equivalent for the following gases: CO_2, CH4, N2O, HFCs, PFCs, SF6 (EN8). Vattenfall and E.ON only account CO_2 whereas EnBW reports SF6 in addition. In 2003 Vattenfall reports CO_2 but it is missing specific information about the other greenhouse gases which are demanded by the GRI guidelines. In the reports of 2004 the company states that its N2O and SF6 emissions' contributions to global warming are marginal in comparison to its CO_2 emissions. (Vattenfall 2005: 74) Actually in the reports of 2005 and 2006 the justification is based on precise data: the three greenhouse gases N2O, CH4 and SF6 are estimated to be less than one per cent compared to the contribution from total CO_2 emissions.(Vattenfall 2006: 45, Vattenfall 2007a: 11.) E.ON states, that it will look in the next CSR reporting period, whether it makes sense to compile data for SF6 and CH4 (E.ON 2006: 42.). However in the 2006 report the company follows the G3 guidelines which require total greenhouse gas emissions as the sum of direct and indirect emissions in tonnes of CO_2 equivalent (EN16).(GRI 2006: 22)

In comparison "to direct and indirect GHG emissions" (EN 8 resp. EN 16) none of the three companies reports "other relevant indirect GHG emissions such as emissions from business

travel" (EN30 resp. EN17). Nor did any explicitly disclose "financial implications and other risks and opportunities for the organization's activities concerning climate change" (EC2) either. This is in particular due to the fact that the majority of reports fulfils the GRI 2002 guidelines, which do not require any disclosure of this kind. E.ON states in its report complying with GRI G3 guidelines that it has recognized the need to reduce its own CO_2 emissions and discussed the attendant opportunities and risks such as those resulting from a change in its investment focus.(E.ON 2007: 28) EnBW informs that the company takes a wide range of measures to reduce the effect of climate change on its business operations.(EnBW 2006: 46)

Together with financial implications of climate change the GRI G3 guidelines introduce "initiatives to reduce GHG emissions and reductions" (EN18). The Sustainability Reporting Guidelines & Electric Utility Sector Supplement characterizes this indicator as a core indicator for the electric utility sector. (GRI 2007: 4) EnBW refers to the G3 guideline in its 2005/2006 report to some extent but does not report this indicator explicitly. Although not required in the GRI 2002 guidelines Vattenfall reports the following initiatives to reduce greenhouse gas emissions.(Vattenfall 2007a: 6):

- collaboration projects are currently underway with big industrial customers and with the City of Berlin (improving energy efficiency),
- distribution of low-energy light bulbs to Swedish and Finnish households,
- research and development in the field of CCS (Carbon Capture & Storage),
- upgrading existing power plants, ensuring that future plants are highly efficient and employing forms of emission free energy production,
- replacing old power plants with new, more efficient plants and
- large investments in low emitting energy sources such as wind, bio, hydro and nuclear power.

E.ON reports the following initiatives to reduce GHG emissions:

- investment of € 8 billion for investment in renewables and enhancing energy efficiency through 2012,
- implementation of a pilot project to identify ways to reduce the carbon footprint of the company's administrative functions and business travel,
- services to help the customers use energy more efficiently, and[8]
- new technologies initiative, which concentrates on boosting the efficiency of hard-coal-fired power stations, carbon capture and storage, offshore wind power, and biogas.

Furthermore the Sustainability Reporting Guidelines & Electric Utility Sector Supplement introduces "the allocation of CO_2 emission permits as an electric utility sector-specific disclosure" (EU4) (GRI 2007: 2). None of the surveyed companies reported this indicator so far. However this indicator established in 2007 is a promising starting point for a further improvement of climate change disclosure in non-financial reporting.

[8] E.ON reports quantitatively the extent GHG emissions reduction achieved in relation to this initiative in E.ON Nordic business (see E.ON 2007: 23).

To conclude it can be stated that in the sample of the three electric utility companies the disclosure of direct and indirect GHG emissions (EN8 resp. EN30) is well established. Other relevant indirect greenhouse gas emissions (e.g. employee commuting, business travel, etc.) are not reported at all (EN30 resp. EN17). In the most recent publications the disclosure of initiatives to reduce GHG emissions (EN18) is adequate however lacks a sufficient quantification of GHG emissions reductions achieved as a result of the initiatives. The disclosure of financial implications and other risks and opportunities for the organization's activities due to climate change (EC2) is still in a premature stage. The companies report their exposure to climate change without specifying any risks due to physical changes associated with climate change or regulatory risks in detail.

5.2 Climate change disclosure within risk reporting

Another way of climate change disclosure is within risk reporting of a company's annual report. In the following chapter the reporting of climate change impacts to the electric utility companies' risks is assessed. Thereby the disclosures of regulatory climate change impacts (e.g., insecurity of legislation related to emissions trading) and physical climate change impacts (e.g., impacts of modified weather patterns) are distinguished. Within the frame of the analysis a clear and direct disclosure is differentiated from an indirect and rather limited disclosure. Table 3 shows the different types of reported risks.

Table 3: climate change disclosures in risk reporting

Risk	2004	2005	2006
Vattenfall			
Operational risk	-	-	-
Currency risk	-	-	-
Credit risk	-	-	-
Fuel price risk	-	-	-
Volume risk	-	-	-
Electricity price risk	indirect physical disclosure	direct regulatory disclosure indirect physical disclosure	direct regulatory disclosure indirect physical disclosure
Political risk	indirect regulatory disclosure	indirect regulatory disclosure	indirect regulatory disclosure
Investment risk	-	-	direct regulatory disclosure
Environmental risk	direct physical disclosure indirect regulatory disclosure	direct physical disclosure indirect regulatory disclosure	direct physical disclosure indirect regulatory disclosure
Plant risk	-	-	-
Network loss risk	-	-	-
E.ON			
Operational risk	-	-	-
Financial risk	-	-	direct regulatory disclosure
External risk	direct regulatory disclosure	direct regulatory disclosure	direct regulatory disclosure –
IT-Risk	-	-	-
EnBW			
Overall economic risk	direct regulatory disclosure	direct regulatory disclosure	direct regulatory disclosure
Industry risk	indirect regulatory disclosure	-	direct regulatory disclosure
Operating risk	direct physical disclosure	-	-
Legal risk	-	-	-
Market, credit and liquidity risk	direct regulatory disclosure	direct regulatory disclosure	direct regulatory disclosure

Although the companies report different types of risks the climate change disclosure in quantitative terms is sufficient. Compared to Swedish company Vattenfall the German electric utilities report only few risks but for half of them climate change impacts are disclosed to some extent. Vattenfall's and E.ON's climate change disclosure seems to increase over time, whereas EnBW's climate change disclosure was already contemporary in 2004 in particular

due to its referring to 2003 heat wave. Out of the German companies this was the only identified explicit and direct disclosure of physical climate change impacts.

In 2006 Vattenfall's climate change disclosure focuses on the following risks:

- Environmental risk

  - One of the great challenges for Vattenfall is to curb emissions of greenhouse gases from fossil-fired power plants and all other business activities. Societal representatives are focusing on this issue with keen interest, and Vattenfall is addressing it from an integrated risk perspective that takes technological and political aspects into account. Toward this end, Vattenfall has initiated a project for large-scale separation and storage of CO2 and is searching for cost-effective internal reduction alternatives among all relevant gases and in all aspects of operations (Vattenfall 2007: 69),

- Electricity price risk

  - Vattenfall's electricity price risk is a risk based on weather (temperature and precipitation), and prices of oil, natural gas, coal and CO2 emission allowances (Vattenfall 2007: 66),

- Investment risk

  - Fuel price forecasts, electricity price forecasts, prices of CO2 emission allowances, district heating prices, investment costs, operating and maintenance costs, and other costs must be factored into the risk analysis, and (Vattenfall 2007: 68),

- Political risk

  - Political risk can concern such factors as changed taxes, environmental surcharges, changes in how natural monopolies are regulated, and political goals for the composition of the energy system (Vattenfall 2007: 69).

In 2006 E.ON's climate change disclosure includes the following risks:

- Financial risk

  - During the normal course of business, E.ON is exposed to interest rate, currency, and counterparty risks a well as electricity, natural gas, coal, oil and CO2 price risk (E.ON 2007: 62), and

- External risk

  - The German Federal Cartel Office is investigating the treatment of CO2 emissions allowances as a cost factor in the price of electricity. A fundamental principle of emissions trading is that treating emissions allowances as a cost factor provides an incentive to reduce CO2 emissions. The Cartel Office is currently investigating whether it is an anticompetitive practise to factor CO2 emission allowances into the price of electricity although the allowances were allocated at no cost (E.ON 2007: 63).

In 2006 EnBW's climate change disclosure concentrates on subsequent risks:

- Overall economic risk

  - The National Allocation Plan for CO2 allowances for the second trading period 2008 – 2012 (NAP II) treats industrial and energy plants differently for the first time. While

the federal government only requires industry in general to reduce their emissions slightly, it expects the energy industry to make a much more substantial reduction in CO2 emissions (EnBW 2007: 92),

- Industry risk

  - Over the long life of a power plant, it is not possible to forecast the decisive parameters precisely (for example raw material, CO2 and electricity sales prices). Moreover, it is still not clear to what extent the ruling for the allocation of CO2 allowances to new plants that go online until 2012 will be upheld in the implementation of the NAP II. The future cost-effectiveness and the long-term profitability of the expenditures on power plants remains subject to risk (EnBW 2007: 94), and

- Market credit and liquidity risk

  - EnBW hedges the generation against falling electricity prices and rising raw material and CO2 prices (market risk) as well as
  - EnBW uses master agreements, (e.g. published by the International Emissions Trading Association): These master agreements for trading with the commodities electricity, CO2, gas and the related derivatives comply with market standards (EnBW 2007: 96).

To conclude Vattenfall, E.ON, and EnBW provide a significant amount of information on the different climate change impacts affecting their business in the risk reports. All three companies disclose the regulatory climate change impact of CO2 price. Apart from that the reporting diverges. Vattenfalls climate change disclosure is rather proactive and indicates its own efforts to reduce GHG emissions. E.ON's and EnBW's climate change disclosure is rather reactive in regard to regulatory climate change impacts. Worth mentioning is EnBW's quantitative climate change disclosure in its risk report. For example the reporting of overall economic risks entirely refers to emissions trading and the National Allocation Plan for CO2 allowances for the second trading period 2008 – 2012 (NAP II).

In 2006 all three companies state a change respectively increase of risks, which are linked to climate change. Nevertheless, none of the companies' disclosures the affect of physical climate change impacts to their risks explicitly. Even though all companies disclosure aspects which are likely to be influenced by physical climate change impacts. Vattenfall seems to be the most sophisticated and reports very perspicuously e.g. the importance of weather to its risk exposure. None of the companies alludes considerably to climate change impacts belonging to litigation, reputation or competition. Nor did any specify opportunities of climate change in detail either.

To conclude it can be stated that climate disclosure in GRI reports and in risk reporting is well established but in many respects the companies do not draw a clear picture how the companies behave in terms of climate change mitigation and adaptation. Sullivan and Kozak 2006 assess the climate change disclosures of European electricity utilities and conclude: "For most of the companies we analysed, it was not possible to fully understand the risks and opportunities presented by climate change for their business, nor was it possible to assess the implications of climate change for their longer-term strategies. (…) for many of the companies we reviewed, it is not clear how climate change issues are factored into business decision making or overall strategy. (…) virtually without exception, company reporting focuses on historic

performance rather than on the consideration of future trends in policy and company emissions." The same could be said in 2008.

6 Conclusion

Climate initiatives are a catalyst for climate change activities and climate change reporting. An improvement of the carbon disclosure could be obtained by a supervision of the compliance of the GRI guidelines by GRI itself. Somewhere in the future it would be desirable to have the GRI guidelines integrated in the national and international reporting standards.

Moreover, our research elaborated on the question, how the companies are reporting on climate change. The analysis of all 55 reports as well as the specific assessment of Vattenfall, E.ON and EnBW illustrated a moderate increase in climate change disclosures in accordance to the GRI guidelines. Also it was assessed what information companies are reporting on climate change. The information given in the reports indicated a noticeable increase in the climate change performance for example in terms of services to help the customers use energy more efficiently, and investments in enhancing energy efficiency in existing power plant as well as renewables. Overall a reasonable enhancement of efforts to further improve both climate change disclosures as well as climate change performance was perceptible. However it is difficult to assess the coherence of these two aspects. Following this contribution it can be derived that disclosure steadily increased over time.

However, taking into consideration, that these initiatives were founded only recently, their influence on a further improvement could not be identified so far. Future research on impacts of participating in a corporate climate initiative to climate change disclosures and performance will be necessary.

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