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Diverging Business Strategies towards Climate Change

A USA-Europe comparison for four sectors of industry

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ABSTRACT

Private companies will play a critical role in successful efforts to address climate change, due to both their role as major emitters of greenhouse gases and to their capacity to invest in mitigation technologies. However, relatively little is known about the triggers for change in corporate behaviour, which are at the basis of corporate decisions to support or oppose policy initiatives.

The research project 'Diverging business strategies towards climate change' has investigated what strategies - and why and how - specific sectors of industry develop to limit greenhouse gas emissions. Objective was to provide information of relevance to the COP 2000 Conference, November 2000 in The Hague. Research was sponsored by the Dutch National Research Programme on Global Air Pollution and Climate Change (NRP).

In an USA-Europe co-operation, researchers have analysed emerging climate strategies in the oil industry, the automobile industry, the chemical industry and the bank & insurance sector. Together, these sectors are the most important players in the climate policy debate. Special attention has been paid to the questions whether strategies of EU based corporations differ systematically from USA based corporations.

Results show rather sectorial specific developments. In most sectors, i.e. oil, automobile and banks, European corporations generally tend to have more advanced policies than their USA counterparts, but this does not apply to chemical companies. Corporate strategies appear to be highly determined by a combination of market situation in their home country and of access to alternative technologies.

In the automobile industry, USA and Europe show convergent strategies. In the other sectors, convergence is not clearly visible.

EXECUTIVE SUMMARY

There is a growing awareness that private companies play a critical role in successful efforts to address climate change, due to both their role as major emitters of greenhouse gases (GHG) and to their capacity to invest in mitigation technologies. However, relatively little is known about the triggers for change in corporate behaviour, which are at the basis of corporate decisions to support or oppose policy initiatives.

Until now, much attention has been paid to interest groups in their initiatives to avoid change. Such attention provides a biased view on industry's perspectives, as it prevents fundamental discussion and hides divergent stances of individual companies. There is growing evidence of divergence in business strategies towards climate change. The question arises whether growing divergence can bring about a break-through in the implementation of the Kyoto Protocol.

The research project 'Diverging business strategies towards climate change' investigated what strategies - and why and how - specific sectors of industry develop to limit greenhouse gas emissions, with the aim to provide information of relevance to the COP-6 Conference, November 2000 in The Hague.

The project focused on strategies towards climate change in four sectors of industry: the oil industry, the automobile industry, the chemical industry and the bank & insurance sector. Together, these sectors are some of the most important industrial players in the climate policy debate. Special attention has been paid to the questions whether strategies of EU based corporations differ systematically from US-based corporations and whether European and US trends are homogeneous or not (*i.e.* do all European/American companies follow a comparative strategy or not).

Table 1 Characteristics of four sectors of industry.

Industry	Position in Fortune Global 500	Type of industry	Direct contribution to climate change	Indirect contribution to climate change
Oil	3 up to 86	Process	Large	Large
Automobile	1 up to 19	Product	Medium	Large
Chemicals	55 up to 266	Process	Large	Large
Bank & insurance	23 up to 127	Service /Product	Small	Large

Table 1 gives basic information about the four sectors under review. As can be seen, there are substantial differences between the sectors. Oil and automobile corporations are among the biggest companies in the world, while chemical companies and banks are somewhat smaller. Some sectors are process oriented (oil, chemicals), while others are product oriented (automobile) or service oriented (bank & insurance). Finally, the direct contribution to climate change differs substantially. Due to their strategic position in the world economy, indirect contributions to climate change, during the Product Life Cycle, are important for all sectors. Automobile producers, for example, influence the energy efficiency of the transport system, while bank & insurance companies are (potentially) able to put environmental demands on their clients.

Table 2 presents results for the four sectors of industry. As can be seen, developments of climate strategies are rather sector-specific. In most sectors, like oil, automobile and banks, European corporations tend to be more active than their USA counterparts. However, this does not apply to chemical companies where USA corporations are both among the most pro-active and the most reactive companies. The automobile industry shows convergent strategies, while in the other sectors a convergence in strategies is not clearly visible. Two groups of corporations show a 'wait and see' strategy, comprising chemical corporations in Europe and banks in USA.

Table 2 Climate strategies in four sectors of industry

Industry	Strategies in USA	Strategies in Europe	Convergence USA-Europe 1997-2000
Oil	Reactive>Active	Active/Pro-active	Minor
Automobile	Reactive>Active	Active	Yes
Chemicals	Reactive or Pro-active	Passive/Active	No
Bank & Insurance	Passive	Active/Pro-active	No

Corporate strategies for climate change seem to be determined by a combination of market situation in the home country and accessibility of alternative technologies. Especially in the oil and automobile industries these explanatory factors come to the front.

Results show that inclusion of non CO₂ gasses in the Kyoto Protocol offers opportunities to make new deals with some sectors of industry. Indeed, several chemical corporations have been able to show remarkable successes in greenhouse policies caused by emission reductions of for example N₂O and HFCs.

A first policy recommendation is to look beyond industry's average. Corporate strategies, even within one country, can be quite different indeed. Corporations with pro-active climate strategies offer opportunities to start 'Kyoto networks'.

A second policy recommendation relates to results in the chemical and bank sectors, which show how important it is to develop workable versions of Kyoto policy mechanisms. As soon as abstract discussions transform into practical solutions, it will be more difficult for corporations to continue a 'wait and see' strategy.

A third policy recommendation is that policy implementation should incorporate a sector-specific broadening of technological opportunities by diffusion of technological knowledge. Access to alternative technologies lessens resistance and can even bring about a change in strategies, such as appeared in the US automobile sector.

A final policy recommendation is that the opportunities of non-CO₂ greenhouse gasses must be fully exploited. Policy packages which include for example N₂O and HFCs offer welcome opportunities to enlarge the scope of market based instruments and/or voluntary agreements.

NEDERLANDSE SAMENVATTING

Het bewustzijn groeit dat particuliere ondernemingen een grote rol zullen moeten spelen in een succesvol klimaatbeleid. Dit hangt samen met enerzijds hun forse aandeel in de huidige emissies van broeikasgassen, anderzijds met hun vermogen om te investeren in emissie-reducerende maatregelen. Tot nu toe is weinig bekend over motieven van ondernemingen om al dan niet kritische te staan ten opzichte van klimaatbeleid.

In de discussies tot nu toe hebben met name pogingen van belangengroepen om klimaatbeleid tegen te houden de aandacht getrokken. Eenzijdige aandacht aan belangengroepen maakt het onmogelijk om fundamentele discussies te voeren en belemmert de blik op – vaak uiteenlopende- standpunten van individuele ondernemingen. Meerdere tekenen wijzen er op dat het bedrijfsleven geen gesloten front vormt. Het is niet uit te sluiten dat toenemende verschillen tussen bedrijven een handvat kunnen vormen om de implementatie van het Kyoto Protocol aan een doorbraak te helpen.

In het project ‘Uiteenlopende bedrijfsstrategieën rond klimaatverandering’ is onderzocht welke ontwikkelingen waar te nemen zijn binnen vier bedrijfstakken. De onderzoeksresultaten kunnen als achtergrondinformatie dienen voor de ‘COP-6’ Klimaatconferentie van november 2000 in Den Haag.

Er is onderzoek gedaan bij de aardolie-industrie, de autoproducenten, de chemische industrie en de bank & verzekeringssector. Deze vier bedrijfstakken zijn dominante spelers in de discussies rond klimaatbeleid. In het onderzoek is speciaal gekeken of de klimaatstrategieën van Europese multinationals systematisch verschillen van multinationals die de Verenigde Staten als thuisbasis hebben. Daarnaast is onderzocht of alle Europese en Amerikaanse ondernemingen een vergelijkbare strategie volgen of dat de strategieën juist bedrijfsspecifiek zijn.

Tabel 1 Karakteristieken van de vier onderzochte bedrijfstakken.

Bedrijfstak	Rangorde in Fortune Global 500 lijst	Aard van activiteiten	Directe bijdrage aan klimaatverandering	Indirecte bijdrage aan klimaatverandering
Aardolie	Tussen 3 en 86	Proces industrie	Groot	Groot
Auto	Tussen 1 en 19	Product ind.	Middelmatig	Groot
Chemie	Tussen 55 en 266	Proces industrie	Groot	Groot
Banken & Verzekeringen	Tussen 23 en 127	Diensten	Klein	Groot

Zoals uit tabel 1 blijkt zijn er belangrijke verschillen tussen de vier bedrijfstakken. Ondernemingen in de aardolie- en auto-industrie behoren tot de allergrootste ter wereld. Chemische- en financiële ondernemingen zijn relatief kleiner. Olie en chemie zijn te karakteriseren als proces industrieën, terwijl in de auto-industrie het eindproduct en bij financiële instellingen dienstverlening voorop staan. Tenslotte verschilt de rechtstreekse bijdrage aan het klimaatprobleem. Vanwege hun strategische positie in de wereldeconomie kunnen alle vier sectoren (potentieel) een grote bijdrage leveren aan klimaatbeleid. Autoproducenten bijvoorbeeld door de energie efficiency van het transportsysteem te verhogen, banken door in hun advies aan klanten rekening te houden met energie-aspecten.

In tabel 2 zijn de resultaten samengevat. De sectoren blijken flink te verschillen voor wat betreft hun klimaatstrategieën. In de olie-, auto- en banksectoren hebben Europese multinationals over het algemeen een actiever beleid dan Amerikaanse. De chemische industrie toont een ander beeld: Amerikaanse chemische ondernemingen zijn zowel erg pro-actief als erg reactief. Strategieën van autoproducenten in de VS en Europa convergeren. In de overige drie sectoren zijn geen duidelijke tekenen van convergentie gevonden. Twee groepen ondernemingen worden gekenmerkt door een afwachtende houding, namelijk chemische bedrijven in Europa en banken in de VS.

Tabel 2 Klimaatstrategieën in de vier onderzochte bedrijfstakken.

Bedrijfstak	Strategieën in VS	Strategieën in Europa	Convergentie VS-Europa 1997-2000
Aardolie	Reactief>Actief	Actief/Pro-actief	Enigszins
Auto	Reactief>Actief	Actief	Ja
Chemie	Reactief of Pro-actief	Passief/Actief	Nee
Banken & Verzekeringen	Passief	Actief/Pro-actief	Nee

Hoe vallen verschillen in klimaatstrategieën tussen ondernemingen te verklaren? In ons onderzoek komen als verklarende variabelen naar voren de (toekomstige) marktpotenties in het land waar het bedrijf zijn thuisbasis heeft en toegang van het bedrijf tot alternatieve technologieën. Vooral in de olie- en auto-industrie is de invloed van deze twee variabelen heel duidelijk.

Uit het onderzoek komt naar voren dat het opnemen van niet CO₂ gassen in het Kyoto Protocol aantrekkelijke opties opent voor met name de chemische industrie. Verschillende ondernemingen in de chemie laten -door terugdringing van N₂O en HFK emissies- een forse beperkingen van broeikasemissies in de jaren '90 zien.

Op basis van de onderzoeksresultaten luidt de eerste beleidsaanbeveling dat het loont om verder te kijken dan het gemiddelde sectorstandpunt. Broeikasstrategieën van vergelijkbare ondernemingen kunnen zelfs binnen een land flink verschillen. Door aan te sluiten bij ondernemingen met pro-actieve strategieën is het mogelijk 'pro-Kyoto netwerken' op te starten.

Veel bedrijven in de chemie- en bankensectoren nemen tot nu toe een afwachtende houding aan. Dit toont aan hoe belangrijk het is om de implementatie van het Kyoto Protocol handen en voeten te geven. Immers, zodra de discussie verschuift van abstracte modellen naar praktische instrumenten, wordt het een stuk moeilijker om geen standpunt in te nemen.

Een derde beleidsaanbeveling bouwt voort op het belang van alternatieve technologieën. Wij bevelen aan om sector-specifieke programma's te ontwikkelen gericht op diffusie van alternatieve technologieën. Onderzoeksresultaten in de autosector tonen aan hoezeer toegang tot alternatieve technologieën invloed hebben op de ondernemingsstrategie.

Een slotaanbeveling luidt om de mogelijkheden van de niet CO₂ gassen in de onderhandelingen volledig uit te buiten. Beleidspakketten waarin naast CO₂ ook N₂O en HFK's zitten

vergroten de onderhandelingsruimte bij discussies over marktconforme instrumenten en/of convenanten.

1. INTRODUCTION

There is a growing awareness that private companies play a critical role in successful efforts to address climate change, due to both their role as major emitters of greenhouse gases and to their capacity to invest in mitigation technologies. Thus, securing the cooperation of companies with their know-how is a key policy objective. At the same time, relatively little is known about the triggers for changes in corporate behaviour, which are at the basis of corporate decisions to support or oppose policy initiatives.

Until now, much attention has been paid to activities of interest groups, especially to their initiatives to avoid change. Such attention provides a biased view on industry's perspectives, as it prevents fundamental discussion and hides divergent stances of individual companies (Kolk, 1999).

There is growing evidence of divergence in business strategies towards climate change (Levy, 1999). In the CFC (ChloroFluoroCarbon) discussions, preceding the Montreal Protocol, growing divergence between companies was essential for the political break-through of the Montreal Protocol (Landis Gabel, 1995; Levy, 1997).

With these ideas in mind, the Dutch National Research Programme on Global Air pollution and Climate Change (NRP) commissioned the Institute for Environmental Studies at the *Vrije Universiteit* in Amsterdam, the Netherlands (IVM-VU) with a study on climate strategies of multinational corporations. IVM-VU found support from other experienced researchers in the field of climate strategies, engaging the Institute for Environmental Management at the University of Amsterdam (WIMM – UvA) and the Department of Management at the University of Massachusetts, Boston (U-Mass). Together, the authors are responsible for texts and conclusions of this report.

1.1 Objectives of the research project

The research project aims to generate information that will enhance a successful climate policy, by exploring strategies of internationally operating corporations within a framework of developments in leading sectors of industry. In particular, the project investigates whether strategies of EU based corporations differ systematically from US-based corporations.

More specifically, the study will provide background information to the next Conference of the Parties (COP-6) of the Framework Convention on Climate Change (FCCC), to be held in The Hague, The Netherlands, in November 2000. The major focus of COP-6 is on the outstanding issues in the Kyoto Protocol to make it ratifiable. Therefore, much attention has been paid to companies' stances on the Kyoto Protocol and to their stances on proposed instruments to curb climate change.

The overall research objective is to examine **what kind of strategies – and why and how – specific sectors of industry develop to limit greenhouse gas emissions. The aim is to provide information of relevance for the COP 2000 Conference.**

Section 1.2. presents the research framework. The final Section 1.3 of this chapter provides an outline of the report.

1.2 Elaboration of the research framework

Research was conducted in two steps. The major step consisted of four parallel case studies in different sectors of industry applying a standard format. An additional second step focused on developments in US and Europe business policies towards controversial issues in the proposed instrument mix of the Kyoto Protocol.

A. Strategies towards climate change in four sectors of industry.

Case studies were conducted in four sectors of industry that are clearly different in both their contribution to climate change and in their overall position in the business world, namely:

1. The oil industry: a process industry with large direct and indirect contributions to climate change; a sector dominated by a few large corporations;
2. The automobile industry: a product industry with limited direct contribution to climate change, but a large indirect contribution via the transport sector; a sector dominated by large corporations;
3. The chemical industry: a process industry with large direct and indirect contributions to climate change; a sector dominated by large companies. The chemical industry is too heterogeneous to cover in a limited project. Therefore, we will concentrate on a few sub-sectors of utmost importance for the climate debate such as HFCs producers.
4. The bank & insurance sector: service industry, with a small direct contribution to climate change, but whose indirect influence is potentially large; diversified sector, with both large and smaller companies.

The oil, chemical, automobile and financial sectors are major players in the climate policy debate. Project participants had conducted previous research in these sectors, so they began with basic sector knowledge. Sector assignment to project participants was as follows:

- WIMM-UvA explored developments in the oil industry;
- U-Mass - Boston explored developments in the automobile industry;
- IVM-VU explored developments in the chemical industry and in the bank & insurance sector.

Research methodology consisted of four parallel case studies running. Case study methodology is most appropriate for this research because of complex relations among actors and variables to be studied. For each sector of industry, we investigated a number of topics:

- a search for dominant trends in both the US and Europe, in order to make a comparison between the two trade blocks;
- an investigation whether US and European trends are homogeneous or not (*i.e.* do all American/European companies follow a similar line, are there important outliers and how/what are the relations between EU and USA based corporations and their subsidiaries in the USA and Europe respectively);
- while focusing on business strategies, search for additional evidence about implementation (*e.g.* investment decisions, business restructuring);
- in explaining diverging strategies, determinants will be sought in both external circumstances (institutional pressures associated with particular national cultural and regulatory contexts) and business capabilities (company-specific economic factors; company-specific technological capabilities; organisational history; information about personnel attitudes);
- in case business strategies have changed over time, what drivers brought about such a turnaround.

The three partners used a unified questionnaire, in order to allow comparisons between the four sectors of industry. This questionnaire is presented in Appendix 1.

As for the selection of companies, we generally chose the biggest corporations in USA and Europe in the Fortune Global 500 list.

B. Generic business trends vis-à-vis controversial instruments for climate change.

In addition to the four case studies, concerted research was conducted on much debated elements of the proposed instrument mix in the Kyoto Protocol like emission trading, joint implementation, clean development mechanism and early action before 2008 (see questions 4a till 4f in Appendix 1). Basic questions were similar to the sector studies; Do dominant trends differ between USA and Europe and how homogeneous are USA and European trends? For this part of research, researchers provided additional information from their network.

Sources of information have primarily been secondary data sources like company publications, trade journals and climate-related publications. Based on their existing networks, some researchers conducted semi-structured interviews in both USA and Europe.

1.3 Outline of the report

Chapters 2 till 5 present results of the four case studies. Chapter 2 examines climate strategies in the oil industry, Chapter 3 focuses on the automobile industry, Chapter 4 examines developments in the chemical industry whereas Chapter 5 presents evidence from the bank & insurance sector.

Chapter 2 till 5 have an identical format. To start with, core data of selected companies are presented. Next, generic business trends in both USA and Europe are discussed and compared (the 'WHAT' question). Subsequently, we investigate possible explanations for these business' strategies (the 'WHY' question). We distinguish between 'economic situation and market positioning', 'regulatory context', 'societal context' and 'company specific differences in strategy-making process', when appropriate. The first three explanations rely basically on external circumstances, while the first (partly) and final explanation investigate business' capabilities. Each chapter finishes with overall conclusions for the sector. An appendix to each chapter provides detailed information about the companies that have been reviewed.

Chapter 6 elaborates on conclusions made up from Chapters 2 till 5 in order to give an overall assessment of business strategies towards climate change.

Chapter 7 connects main conclusions to recommendations for policy initiatives and for future research.

2. THE OIL INDUSTRY'S RESPONSE TO CLIMATE CHANGE

For the oil part of the project, the largest multinationals have been selected – Exxon Mobil, Royal Dutch Shell and BP – supplemented with another major company in the US, Texaco, particularly interesting as it has recently changed its position. This enables an excellent comparison between the US and Europe. As table 1 shows, these companies rank high in the global Fortune listing, with sizeable revenues and many employees. Both BP (with Arco and Amoco) and Exxon (with Mobil) have become substantially larger in recent years.

Table 2.1. Core data of the selected oil companies.

Name	Ranking (Fortune Global 500)	Headquarters	Sales 1999 (\$ billion)	Employees (1999)	Major products
Exxon Mobil	# 3	US	164	106,000	oil & gas
Royal Dutch Shell	# 11	Dutch/UK	105	96,000	oil & gas
BP	# 17	UK	84	80,400	oil & gas
Texaco	# 86	US	36	18,363	oil & gas

Source: Fortune, 2000.

2.1 Generic trends in USA and Europe

There is considerable variation in the strategic responses to climate change exhibited by oil companies based in different geographic regions. Two years ago, a number of oil companies, primarily the European-based BP and Shell, announced initiatives to invest significant resources in low-emission and renewable energy sources. They have adopted a more open stance toward climate science and the Kyoto protocol, and have joined industry associations and partnerships with environmental non-governmental organizations (NGOs) that reflect these perspectives.

Most US companies such as Exxon Mobil, however, maintain a strong lobbying stance against mandatory GHG reductions, arguing that these measures are not justified by the science and are prohibitively expensive. They have not joined their European counterparts in investing in renewables. Most recently, there have been signs of movement in the position of

US-based companies, especially Texaco which states that it is necessary to move beyond the science, but for the rest the trans-Atlantic gulf remains.

Accordingly, BP and Shell are most active on the measurement and (external) monitoring of greenhouse gases, and have set quantitative targets for emission reduction. Texaco has also started to collect emission data.

2.2 Economic situation and market positioning

In view of the disruptive nature of low-emission technologies for traditional oil markets it is not surprising that the initial position of most oil companies on climate change was strongly against emission controls. Economic explanations for subsequent differences in political and technological strategies (such as differences in market positioning, or the possession of relevant expertise and technology) turn out to be inadequate, however, given the basic similarity among the companies.

More important, perhaps, are expectations concerning future market prospects for low-emission technologies; these are influenced by the regulatory and societal context in companies' home countries (see below). Some US companies invested in renewables during the mid-1970s when the government provided subsidies, only to lose substantially on these investments later when a new administration ended subsidies abruptly. US companies learned from this that there is little consumer interest in renewables, and that investments in businesses supported by subsidies are highly risky. Shell and BP, by contrast, lack this experience. Shell and BP are currently investing in renewable energy, whose technological progress has been considerable since the 1970s.

Companies such as Shell and Exxon Mobil have moved toward the view that climate change is less of a threat to their core oil and gas businesses, because substitute transportation fuels are unlikely to be widely available in the next 15-20 years.

2.3 Regulatory context

A general comparison between both regions shows that in the US climate change became a political issue at an earlier stage than in the EU. Whereas Hansen's testimony before the US House Energy Committee in summer 1988 generated considerable media attention and alarmed the industry, European attention emerged more slowly with the preparations for the

1992 United Nations Conference on Environment and Development. This different evolution affected industry's collective response. In Europe, no issue-specific lobbying association was formed. By contrast, US industry established the Global Climate Coalition (GCC) in 1989. It represented major users and producers of fossil fuels such as the oil, automobile, and electric utility sectors, but also other energy intensive sectors such as cement, aluminium, iron and steel, chemicals, and paper. As far as the oil companies are concerned, Exxon Mobil has remained an individual member until the GCC reorganized in 2000 and stopped accepting individual company membership - in itself an indication of the weakened position of the GCC. Texaco left in early 2000, coinciding with its overall changed position on climate change; this also applies to Shell (Oil), which left in 1998.

The US Congressional hearings on climate change exemplified the adversarial, legalistic courtroom style through which the scientific basis for regulation is developed and contested in the US. Accordingly, in Exxon Mobil's opposition to regulation, the unreliability of the science of climate change has played a large role. By contrast, the European approach is different: challenging the science and the Inter-governmental Panel on Climate Change (IPCC) without willingness to cooperate and work on alternatives is not very acceptable in political arenas. Such an attitude negatively affects the legitimacy of companies' negotiating position. This has clearly influenced the positions taken by the European oil companies BP and Shell. From a European perspective, Kyoto ratification and the momentum toward mandatory emission controls appear unstoppable. From a US perspective, industry's challenge has been remarkably successful; the prospects for ratification are low, and targets are unlikely to be met. Accordingly, policy mechanisms such as emissions trading, joint implementation and the clean development mechanism are considered by BP and Shell; most recently Texaco has adopted a comparable stance. Exxon Mobil, however, continues to object these mechanisms, as it is seen as causing too much overhead, and lead to conflict and litigation. More generally, Exxon has emphasised the arbitrary nature of the Kyoto cuts and the ineffectiveness of the Kyoto Protocol.

In spite of major US-Europe differences, however, it can be asked whether convergence between lobbying practices on both sides of the Atlantic is taking place. Various international institutional structures have developed, such as the International Chamber of Commerce, the Trans-Atlantic Business Dialogue and, specifically for the oil industry, IPIECA. Participation in common industry associations and cooperation on implementation mechanisms for Kyoto may help to forge a common viewpoint regarding companies' strategic in-

terests. The recent Texaco position change can be placed in this context. Currently, however, European companies appear to be more active than their US counterparts when the design of constructive approaches to climate policy is discussed.

2.4 Societal context

As already indicated in the previous section, the different attitude in both regions concerning the importance of climate policy and the types of instruments, resulting in different approaches by the oil companies, does not only originate from the regulatory context, but also from different societal perceptions of environmental issues. Concern about climate change is more widespread in Europe than in the US; challenging the science of climate change is not considered very acceptable. Accordingly, Shell and BP are not challenging the science, adhering much more to a precautionary principle: even if climate change may perhaps not be proven, there is enough evidence to take measures. Texaco also publicly stated in early 2000 that the science is not that important and that there is enough evidence to take measures. Exxon Mobil has emphasised from the very beginning up to the present that the science is uncertain.

Broader than climate change has been increasing concern in Europe about the environmental impact of oil companies. This has become a contentious issue in recent years, particularly following Shell's activities in Nigeria and the controversy around the Brent Spar platform. Shell managers made the case that they were taken by surprise at the public and political pressure created by the Brent Spar and Nigerian incidents, and have since taken strong measures to be responsive to social and environmental concerns. A lack of social legitimacy is seen as a fundamental threat to the firm. Moving sides somewhat earlier than Shell, BP has made a strong public statement about climate change in an attempt to acquire a green(er) profile. At Exxon Mobil, the company prides itself on providing one consistent message concerning climate change internally and to the world.

Generally speaking, Shell and BP have a more cooperative approach towards NGOs and tend to consult them or discuss with them at various occasions, to be kept informed about societal perceptions. Texaco's new policy also involves a more cooperative approach towards climate change.

2.5 Company-specific differences in strategy-making process

The strategy-making process is quite different in Shell and Exxon Mobil. Although US-based oil companies have long been multinational, perspectives from Europe and elsewhere may not easily permeate into the deliberations of top management. Exxon has a highly centralized strategy making process concerning climate change, with little room for local discretion. Shell has traditionally been a much looser organization, providing more room for independent initiative.

In Shell, the corporate strategy group deliberately develops scenarios to challenge management thinking, and the 'People Power' scenario envisages substantial public pressure about globalisation and the environment, which translates into political pressure. Shell also believes that developing new competencies takes many years, so early investments are needed. Exxon, by contrast, has a very small corporate planning group, is strongly focused on running very tight financial controls, and can remain profitable even with very low oil prices. It therefore feels less pressure to invest in alternative technologies. Exxon employs a climate scientist who has become a 'sceptic', and is a key figure in developing Exxon's strategy.

2.6 Conclusions for the oil industry

In the oil industry, there continues to be a division between US and Europe, although the recent move by Texaco is blurring this clear-cut division. In principle, BP and Shell (now followed by Texaco) are taking a positive approach to different policy mechanisms. Both European companies actively participate in different forums to discuss policies.

Despite the continuing differences between US and Europe, however, some degree of convergence can be expected, given that the companies involved are large multinationals engaged in each other's markets, and are actively involved in a process of globalisation. The recent change of Texaco provides an indication of this development.

3. THE AUTOMOBILE INDUSTRY'S RESPONSE TO CLIMATE CHANGE

For the automobile case study, the four largest multinationals have been selected – General Motors (GM), Ford, Daimler Chrysler and Volkswagen. This brings an equal division between US and European based corporations. As Table 3.1 shows, all companies score in the top of the global Fortune listing. Both their sales and employment are impressive. Daimler has become substantially larger in recent years by a merger with US No.3 Chrysler.

Table 3.1 Core data of selected automobile companies.

Name	Fortune Global 500	Headquarters	Sales 1999	Employees	Major products
General Motors	# 1	USA	\$176 billion	388,000	Motor vehicles and parts
Ford Motor	# 4	USA	\$162 billion	364,550	Motor vehicles and parts
Daimler Chrysler	# 5	Germany	\$160 billion	466,938	Motor vehicles and parts
Volkswagen	#19	Germany	\$ 80 billion	306,275	Motor vehicles and parts

3.1 Generic trends in USA and Europe

Until 1997/98 there was a very clear distinction between European and US-based companies. US-based companies were strongly opposed to mandatory emission controls, publicly challenged the scientific basis for action, and pointed to the high economic cost of controls. Emissions were steadily increasing, due to increasing vehicle weight, increasing sales, and increasing vehicle miles travelled.

Environmental efforts of US companies were focussed on reduction of NO_x and hydrocarbons to meet California air quality regulations and anticipated LEV (Low Emission Vehicles), ULEV (Ultra Low Emission Vehicles) standards for conventional (non-carbon) emissions. European companies were not in a position to challenge IPCC reports and in July 1999 entered a voluntary agreement with the EU to reduce average carbon emissions to 140 g/km by 2008, about 25% from 1999 levels (the agreement includes European subsidiaries of US-based companies, but not Japanese firms).

European technological investments emphasized diesel and small lightweight cars as short to medium term approaches to emission reductions. Daimler invested heavily in fuel cells, a more radical and longer-term approach. European companies expected consumers to change their expectations concerning vehicle usage and the role of private vehicles in transportation networks. This could be characterized as a “technology-push” approach, meaning that the companies expect to push the market with new technologies and vehicle concepts.

The major technological investment efforts for the US companies during the pre-Kyoto period were through a program partially funded by the US government. The goal of the Partnership for a New Generation of Vehicles (PNGV) consortium was to develop a car achieving 80 mpg without sacrificing comfort, capacity, safety, or range. This reflected the fundamental belief of US companies that consumers are not willing to buy cars with environmentally superior performance but at the cost of traditional attributes. The companies also do not believe that many consumers would be willing to pay a significant premium for cleaner cars. The PNGV program has worked on lightweight materials, compression ignition direct injection diesel engines, hybrids, and other approaches. The US companies have also invested significantly in alternative fuels technologies, such as methanol, compressed natural gas (CNG), and liquefied petroleum gas (LNG). The companies have committed to make “production-ready” prototypes of vehicles based on PNGV research, but will not commit to production for sale unless there is “business case” i.e. a profitable market. GM has invested substantially in its electric vehicle (EV1), which was introduced for sale in 1996. This was primarily motivated by California’s local air quality regulations rather than climate concerns. The US approach can be characterized as “market-pull”, meaning that company strategy is pulled by consumer demand patterns.

After the signing of the Kyoto Protocol in 1997, US companies changed course quite dramatically. While remaining opposed to the Kyoto Protocol, they moderated their position on climate science and the economic consequences of controls. Ford invested heavily in fuel-cell research, has committed to the production of a hybrid SUV (Sport Utility Vehicle), and has acquired TH!NK, a small electric car company. GM has entered an alliance with Toyota to invest in a range of technologies. Both companies left the Global Climate Coalition. Also, GM has formed partnerships with the oil company BP and Ford with BP and Mobil for research and development of new fuels and automobiles that use them.

Overall, there appears to be a process of convergence between European and US companies in a strategy of accommodation in order to gain a seat at the climate policy table. However, important differences remain. US companies are still not planning the mass-production of low-weight vehicles with high fuel efficiency. European companies are quite explicit in adopting uniform environmental standards globally. US companies do not do so, and concerning climate change in particular, clearly have different strategies in the US and Europe. Finally, US companies are strong advocates of voluntary and market-based flexible mechanisms and remain opposed to the Kyoto Protocol, while European companies have been more accepting of mandatory emission controls.

3.2 Economic situation and market positioning

Controls on emissions of GHGs would raise the cost of gasoline for cars, reduce the demand for automobiles and gasoline, induce some switching to other forms of transportation, and spur the development of low-emission technologies. Investments in R&D for low-GHG products appear highly risky because of the uncertainty regarding climate science, regulatory responses, and the potential market for low emission technologies. No single company possesses the market power to establish new standards and ensure success for new products. It is unclear to what extent car companies can successfully “reinvent themselves” as providers of transportation services, given the specificity and inertia of corporate competencies. Low-emission automotive technologies such as hybrids, fuel cells, or pure electric drive chains represent radical technological change that threatens the position of dominant car companies. Not surprisingly, the initial position of most automobile companies has been hostile to mandatory emission controls.

US-based car companies were particularly threatened by emission controls because US demand patterns favour larger, heavier vehicles, with a rapid growth in sales of SUVs and light trucks. Indeed, Ford and GM made most of their profits in 1998 and 1999 from these large vehicles. American companies have historically been weak in the small, fuel-efficient market segment. European companies have relatively strong market shares in this segment, because of demand patterns that are affected by high fuel prices and road infrastructure favouring smaller vehicles. Although it is easy to conclude that the European producers are better situated to meet the challenge of climate change, it would be relatively difficult for them to achieve incremental reductions in weight and fuel consumption.

Companies have different levels of expertise with specific low-emission technologies. GM has considerable experience with electric drive trains, as the only company to have designed, produced, and marketed a pure electric vehicle. European companies have more experience with diesel engines for passenger vehicles. US companies entered into a range of voluntary research programs with the US government relatively early, particularly PNGV, the US Advanced Battery Consortium, and Climate Wise. These programs excluded European companies. Comparable European programs were developed in the latter 1990s, and US subsidiaries were able to join them.

Differences between the companies are perhaps better explained by their perceptions and expectations concerning markets for low-emission products. The American companies based their strategies on the belief that consumers would not pay a premium for environmental benefits, and would not want to sacrifice conventional attributes such as size, comfort, safety, or power. The companies also believed that consumers would not accept diesel engines because they would remember the noisy, vibrating, low-torque engines from the 1970s and early 1980s. By contrast, European companies considered that consumers might be willing to change their vehicle usage and demand patterns, adapt to smaller vehicles, and integrate private and public transportation in new ways. European companies were also more optimistic about diesel technology.

Despite these differences, it should be emphasized that European and American companies are all multinationals active in each others markets and might be expected to respond to the market conditions in these various markets. Globalisation of the companies' production and management structures thus provides some pressure for convergence. Cross-border mergers and acquisitions, such as the Daimler-Chrysler and Ford-Volvo mergers, accelerate this process. The companies are also forced to respond to competitors' moves; after Daimler invested more than \$400 million in the fuel cell company Ballard, Ford also invested a similar amount in the venture. Participating in common institutional structures such as the negotiations over implementation mechanisms also tends to exert a convergent pressure on companies' perspectives on the climate issue.

3.3 Regulatory context

Regulatory pressure in the US focussed on air quality, especially the stringent standards set in California (CARB Regulation) and followed by Massachusetts. The technological

strategies of the US auto companies were thus primarily geared toward addressing local air quality by reducing smog precursors such as sulphur oxides (Ox), nitrous oxides (NOx) and hydrocarbons. This could be achieved largely through end-of-the-pipe approaches such as improved catalytic converters rather than higher fuel efficiency. CAFE standards have not been increased in the US since the early 1990s, and so companies have not been under pressure to improve fuel economy. American companies were concerned that the EPA would not relax particulate emission standards to allow diesel technology to be widely used in passenger vehicles.

In Europe, politicians were looking to the auto industry for substantial, early emission reductions. The European auto industry lacked a powerful multi-industry lobby like the Global Climate Coalition in the US. Germany had unilaterally committed to significant GHG reductions during the Framework Convention on Climate Change (FCCC) negotiations in Berlin in 1994 and had pushed the German auto industry association, the VDA, into a “voluntary” agreement to reduce CO₂ emissions from new cars by 25%. Concerned that these constraints might affect the competitiveness of its national automobile companies, Germany then pushed the EU to adopt similar measures. The European Commission introduced a proposal to reduce average CO₂ emissions from new cars from 186 grams/km to 120 g/km by 2005 (equivalent to about 45 mpg). The European Parliament called for even stricter limits, with a figure of 90 g/km being mentioned. After three years of negotiations, in 1998 the European Automobile Industry Association (ACEA) accepted a voluntary agreement to reduce emissions to 140 g/km by 2008, while maintaining the 120g/km target for 2012. Ford Europe and GM Europe participate in this agreement.

3.4 Societal context

As already indicated in Section 2.4 on the oil industry, the different attitude in US and Europe concerning the importance of climate policy and the types of instruments, resulting initially in different approaches by the automobile companies, does not only originate from the regulatory context, but also from different societal perceptions of environmental issues. Concern about climate change is more widespread in Europe than in the US; challenging the science of climate change is not considered very acceptable. Accordingly, Daimler and Volkswagen did not challenge the science. In contrast, Ford and GM emphasised up to 1997 that science is uncertain. After 1997, they moderated their position.

Probably more important in societal discussions are perceptions of changes in lifestyle that could be brought about by tight emission standards. Americans are held to be more individualistic, and more concerned about their lifestyles than the environment than Europeans. This brought US companies to the belief that American consumers do not want to sacrifice mobility aspects of their existing lifestyle such as size, comfort, safety and power. European companies are more optimistic about changes in consumers' behaviour.

3.5 Company-specific differences in strategy-making process

Perspectives on climate science played an important role in driving climate strategies at the auto companies. Ford expressed strong skepticism toward climate science externally and also appeared to have internalized this perspective. GM was somewhat more moderate in its approach, perhaps due to the influence of a senior level internal scientist who had championed the issue during the early 1990s. European companies lacked internal scientific capacity, and were thus more willing to defer to official reports such as the IPCC.

Prior experience with low-emission technologies is also an important determinant of strategy. GM had lost over \$500 million on the electric car, and Ford a similar amount on sodium sulfur batteries, so both companies viewed future investments in a skeptical light. European firms lacked this negative experience and were more optimistic.

GM's more decentralized structure has perhaps allowed some divisions to pursue a more accommodating stance on climate change. The electric car, for example, was developed even when many in corporate HQ opposed this. Ford's policy, in a manner similar to Exxon, was more tightly controlled from the centre.

3.6 Conclusions for the automobile industry

Until 1997/98 there was a very clear distinction between European and US-based companies. US-based companies were strongly opposed to mandatory emission controls, publicly challenged the scientific basis for action, and pointed to the high economic cost of controls. European companies, by contrast, were not in a position to challenge IPCC reports and in July 1999 entered a voluntary agreement with the EU to reduce average carbon emissions about 25% in the 1999-2008 period (the agreement includes European subsidiaries of US-based companies).

After the signing of the Kyoto Protocol in 1997, US companies changed course quite dramatically. While remaining opposed to the Kyoto Protocol, they moderated their position on climate science and the economic consequences of controls. Ford and GM invested in a range of new technologies. Both companies left the Global Climate Coalition. Overall, this resulted in a process of convergence between European and US companies in a strategy of accommodation in order to gain a seat at the climate policy table.

However, important differences remain. US companies are still not planning the mass-production of low-weight vehicles with high fuel efficiency. European companies are quite explicit in adopting uniform environmental standards globally. US companies do not do so, and concerning climate change in particular, clearly have different strategies in the US and Europe. Finally, US companies are strong advocates of voluntary and market-based flexible mechanisms and remain opposed to the Kyoto Protocol, while European companies have been more accepting of mandatory emission controls.

4. THE CHEMICAL INDUSTRY'S RESPONSE TO CLIMATE CHANGE

The chemical industry is dominated by large corporations that operate internationally. The sector can be characterised as a process industry. Chemical companies contribute substantially to climate change, both directly in their production processes and indirectly in the life cycle of their products.

A major feature of the chemical industry is its heterogeneity; chemical companies produce a large variety of products, some in large volumes (e.g. basic chemicals, plastics, fertilisers) others in smaller volumes (e.g. colorants, health care). It is common to distinguish between bulk chemicals and specialty chemicals. Bulk and specialty chemicals differ substantially in technical, environmental and market properties. As the product mix of individual companies can be quite specific, one must always be careful in making generalisations.

Table 4.1 presents core data of the six companies that were investigated. We included dominant companies, according to the Fortune Global 500 list and a number of companies that produce HydroFluoroCarbons (HFCs).

Table 4.1. Core data of selected chemical companies.

Name	Fortune Global 500	Headquarters	Sales 1999 in billion USD	Employees	Major products
E.I. du Pont de Nemours	# 55	USA	45	98,000	Life sciences, materials, energy
Dow Chemical ¹	#205	USA	19	39,000	Chemicals, plastics, agriculture products
Allied Signal ²	#266	USA	13	87,500	Aerospace, automotive, engineered materials
Bayer AG	# 86	Germany	31	120,400	Health care, agriculture, polymers, chemicals
BASF AG	# 93	Germany	29	105,945	Health, colorants, chemicals, plastics, oil/gas
ICI	#262	UK	14	45,000	Speciality products, paints, industrial chemicals

¹ Dow Chemical plans to merge with Union Carbide (USA) in Fall 2000

² Allied Signal merged with Honeywell Inc. in Fall 1999 to form the 'new' Honeywell Inc.

We studied the three largest American and three largest European corporations. As can be seen from Table 4.1, contrary to the big oil and automotive companies, chemical companies are not among the biggest corporations overall; Du Pont takes #55 in Fortune Global 500 list. In Europe, two German companies and one British company were selected. It could have been interesting to investigate corporations based in other European countries like France or Switzerland as well, but they rank lower in the Fortune 500 List.

From the selected companies, three companies (Du Pont, Allied Signal and ICI) produce HFCs. Before 1995 they produced CFCs as well. For these companies, we specifically investigated their strategies towards HFCs and related products c.q. substitutes.

4.1 Generic trends in USA and Europe

The heterogeneity of the product mix in the chemical industry offers substantial room for company-specific markets and institutions. Appendix 4 lists our findings for individual corporations. The Appendix provides detailed information about stances and actions of each company. In this paragraph we look for trends among and differences between US and European-based corporations.

The most striking result for the chemical industry is that one cannot observe a generic antagonism of GHG strategies between US-based companies and European based companies. The US-Europe dichotomy which can be observed in oil and –up to 1997- in automotive corporations cannot be found in the chemical sector. USA based companies range between most pro-active (Du Pont; prepares for CO₂ emission trading and has set a 2010 target of 10% energy use from renewable resources) and most reactive (Allied Signal; no stance on climate problem and 'economic development has priority over environment'). The European companies are somewhere in between (predominantly a 'wait and see' policy).

In fact every company seems to have a specific stance. It is daunting to speculate where this diversity comes from: from the composition of Business Units, from history, from the CEO's commitment?

Looking at product strategy, Du Pont and ICI are moving from bulk to specialty chemistry, Dow sticks to bulk products, Bayer and BASF stick to an existing combination of bulk and specialty chemistry, while Allied Signal/Honeywell is in fact an outsider from the engineering industry. A proposition that producers of specialty chemicals are less vulnerable to

Climate Change Policies and therefore will have a more pro-active stance, does not hold *per se*.

Chief Executive's commitment certainly plays a role in certain cases. Examples are pro-active speeches of Du Pont's CEO Chad Holliday and Dow's initiator in the eco-efficiency movement Claude Fussler (C. Fussler and P. James, 1996). In contrast, the German-based companies of Bayer and BASF seem to be well organised but are low in publicity and public statements of Board members.

Chemical companies on both sides of the Atlantic Ocean adhere to the Responsible Care Initiative. This implies that chemical businesses have committed themselves to monitor environmental impacts and to publish environmental data. Does this support an easy comparison between the six companies? Unfortunately, this is not the case. Responsible Care practises show a large variety in reporting of GHG emissions and in elaborating on GHG emission target setting.

With regard to monitoring of GHG emissions, almost all companies monitor GHGs other than CO₂ such as N₂O, CFCs and HFCs. But because every company chooses a different format for reporting - where some companies focus on CO₂ while others include other relevant GHGs - comparisons become in fact impossible. What can be seen, however, is that chemical corporations, combining several substances from the Kyoto basket, succeed in showing remarkable results in the 1990s: a reduction in GHG emissions of 30% to 60% in CO₂ equivalents has been achieved (e.g. Du Pont, Bayer, ICI). We can conclude that chemical companies are among the winners from the decision to include non CO₂ gasses in the Climate Negotiations, because they provide them with much low hanging fruit. In fact, successes as reported are mainly due to elimination of N₂O process emissions and replacement of CFCs by HFCs. With respect to CO₂ the overall picture is that energy savings are more or less offset by production increases.

What has been said about GHG monitoring, applies equally to quantitative targets for reduction of GHG emissions. Some companies have relative targets for energy efficiency improvements (Dow, ICI), others provide absolute emission targets (Du Pont, Bayer). Some companies provide targets for CO₂ only (BASF), while others include other GHG (Bayer, Du Pont). Again, the use of a specific format of targets is not related to only US or only European companies. Instead, each company has developed its own system of targets. As growth in future production is uncertain, it is almost impossible to compare absolute and relative energy targets. Partial inclusion of other GHGs make comparison between

companies even more difficult. Du Pont is unique as this company has an explicit 10% target for use of renewable energy in the year 2010.

We investigated whether the six corporations under review apply specific investment criteria for reduction of GHG. It appears that most companies mention quite generic criteria like improving energy efficiency or enlargement of cogeneration. Bayer uses gas instead of coal in its power plants as part of a strategy to lower CO₂ emissions. Surprisingly little is published about actual investments in environmental protection, let alone about investments in energy savings and other Climate Change related investments. Only Du Pont and Bayer publish data about overall environmental investments.

Finally, we present some examples of organisational innovations made by the companies under review. ICI introduced the *Environmental Burden System* for monitoring and reporting of emissions. For the topic Climate Change, ICI's System includes all GHG and converts them into CO₂ equivalents. Under Claude Fussler, Dow developed its *Eco-Innovation Compass* as a guideline for product development. Energy intensity of products is one of the six criteria for product development at Dow. Both ICI and Dow are moderately active with regard to Climate Strategies. This implies that innovative tools do not automatically bring about pro-active strategies.

4.2 Economic situation and market positioning

We mentioned before the heterogeneity of the product mix in the chemical industry. This heterogeneity has implications for both the energy dependency of the specific businesses and for the market positioning. Generally speaking, bulk chemicals are more energy intensive (both as feedstock and as auxiliary in production processes) than specialty chemicals. The market for specialty chemicals tends to be better than for bulk chemicals because there is a higher probability of growth markets and/or niche markets. This fact, combined with the fact that value added of specialities is higher than for bulk, implies that a product mix dominated by bulk chemicals is generally considered as a weak point whereas specialisation in specialties is considered a strong point of a company.

What evidence on product line acquisitions or diversification do we find? Of our six companies, two want to shift from bulk to speciality chemistry (Du Pont in USA; ICI in Great Britain). The other companies stick to their existing portfolio: Dow relies heavily on bulk chemicals; Bayer and BASF plan to continue a mix of bulk and speciality chemicals; Al-

lied Signal/Honeywell produce speciality chemicals in a predominantly engineering company. It appears that the product mix strategy of the six corporations is quite company specific. Again, various strategies appear on both sides of the Atlantic. A USA-Europe dichotomy cannot be found.

What specific changes in product portfolios to combat GHG emissions do the six companies mention? From what has been said above, it will be no surprise to find that Du Pont (investment in biotechnology and life sciences; divestment in an oil company) and ICI (investment in speciality chemicals and biotechnology; divestment in plastics) report important changes in their product portfolio and coinciding GHG emissions reductions. Interestingly enough, also Bayer decided on changes in its energy related portfolio (investment in photovoltaic energy; divestment in oil feedstock). On the more tactical level of the fuel mix, Du Pont (renewable energy), Dow (cogeneration) and Bayer (conversion of power stations from coal to gas) indicate changes in their fuel mix. Allied Signal is most deterrent in discussing policies to combat GHG emissions; while acknowledging that improvements in energy efficiency offer win-win options, 'power output remains necessary for sustainable economic development'.

Three of the six corporations under review -Du Pont, Allied Signal/Honeywell and ICI- produce HFCs in replacement of CFCs. With regard to HFC production, all three producers state that they are committed to continue production. The reason is that they consider HFCs the best available substitute for CFCs. We did not find initiatives of early replacement of HFCs by substitutes with less impact on Climate Change. However, in order to limit HFC emissions all three HFC producers invest in process optimisation and in recovery/recycle schemes for customers. In this context, BASF mentions a replacement of CFCs by pentanes instead of by HFCs.

4.3 Regulatory context

In Section 2.3 on the oil industry, USA policy making was characterised as legalistic based on technical arguments, while European policy making shows a more consensual style based on political arguments. Can we recognise this difference in public stances of chemical corporations?

Du Pont, Dow, Bayer and ICI have public stances about Climate Change on websites and in environmental reports. Interestingly enough, USA based Du Pont and Dow are more

pronounced in support of climate policies than the more reserved opinions of European based Bayer and ICI. Also with regard to economic consequences of GHG emission reduction policies, Du Pont and Dow are more positive than Bayer and ICI.

In a US-Europe comparison, basic stances in the chemical industry do not follow stances found in the oil and automotive industry. How can such a contrast be explained? A first possibility is that some chemical companies are more keen than others to utilise sector specific opportunities by a change the product mix or by showing a favourable emission history including non CO₂ GHGs like N₂O, CFCs and HFCs.

Table 4.2 Stance on Climate Change; possible explanations.

Company	Stance on Climate Change	Change in Product Mix	Inclusion of non CO ₂ GHG in monitoring
E.I. du Pont	Positively	Yes	Yes
Dow Chemical	Positively	No	Yes
Bayer AG	Neutral	No	Yes
ICI	Neutral	Yes	Yes

Source: Appendix 4.

The information available, as presented in Table 4.2, does not show a direct link between product mix and/or inclusion of non CO₂ GHGs and policy stance. One possible explanation for this missing link may be that the six investigated chemical companies are insufficient to get an overall picture or that the selected companies are not representative for the chemical sector. The question whether our selected companies provide a balanced picture can only be answered by research in additional companies.

When it comes to practical aspects of policy making, company stances in USA and Europe are more like auto and oil sectors. However, the picture is far from complete as most chemical companies remain silent up to now on the Kyoto Protocol and on policy instruments to curb Climate Change. Predominant strategies seem to be 'wait and see' and delegation of opinions to industry associations.

Only ICI and Du Pont discuss the Kyoto Protocol. ICI reveals a neutral stance, describing history so far. Du Pont shows a negative attitude towards Kyoto, as 'the protocol will work negatively because its targets are too aggressive'.

With regard to policy instruments to curb climate change, only Du Pont and ICI give substantial information: they favour emission trading and voluntary agreements. Dow supports

emission trading as well, because this instrument improves efficiency. Du Pont refers positively to its participation in EPA's voluntary Climate Wise Program, while ICI positively mentions voluntary agreements on energy efficiency in the UK and in the Netherlands. At an European level, voluntary agreements for the chemical industry do not exist yet. For obvious reasons, the most pro-active company Du Pont demands credits for early actions. Not specifically related to Climate Change but certainly interesting in a discussion about a regulatory context, are divergent views between European companies about Western Europe as a remunerative base for industry: UK-based ICI proclaims a very negative attitude, caused by social and environmental pressures. In contrast, German-based Bayer and BASF are very positive about their 'home market Europe'. Probably, this UK-German dichotomy reflects an antithesis between courtroom policy making (UK) and consensual policy making (continental Europe).

A final element of the regulatory context has to do with corporate policies towards subsidiaries all over the world. Some companies state that they have uniform policies and that all subsidiaries have to meet identical corporate standards (Dow, Allied Signal, Bayer). Other companies do not prescribe uniform policies (Du Pont, BASF, ICI). In these companies, subsidiaries have to comply with local regulations. Again, the dividing line between uniform or non-uniform standards does not coincide with the Atlantic Ocean.

4.4 Societal context

Europeans, it is often claimed, are really concerned about environmental issues. Americans, by contrast, are held to be more individualistic, more concerned about their lifestyles than the environment and more ideologically adverse to regulation.

One can repeat here what has been said above about Climate Change and the Kyoto instruments. On an abstract level, US companies are more pronounced in support of Climate policies than European based companies. On a more concrete level, stances of US and European companies are more or less in equilibrium. The contrast with oil and automotive industries remains big; dominant USA players in the chemical industry show a positive attitude towards climate policies, whereas their European counterparts show a much more reserved position.

The positive or neutral attitudes towards climate policies manifest themselves in membership of industry associations. The 'prudently positive' World Business Council for Sus-

tainable Development (WBCSD) is a favourite in the chemical industry. Additional associations that show up are the NGOs Pew Centre (Du Pont) and Forum for the future (ICI). With regard to co-operative programs with local neighbours and NGOs, USA shows more activity than Europe. In America, Community Advisory Panels at plant level have become common. This applies also for subsidiaries of European corporations. Moreover, Du Pont and Dow mention additional initiatives in cooperation with NGOs and local communities. However, it can be hypothesised that European NGOs rely more on contacts with regulators.

4.5 Conclusions for the chemical industry

In the chemical industry, stances on Climate Change and GHG policies are company-specific rather than country-specific. A clear US-European dichotomy cannot be found. In fact, American companies range between most pro-active and most reactive. European companies are in between.

It is important to note that chemical corporations have sector specific opportunities to limit GHG emissions, by changing their product mix and by limiting emissions of non CO₂ GHGs such as N₂O, CFCs and HFCs. These companies are favoured by the inclusion of non-CO₂ GHGs in the Kyoto Protocol.

In the chemical industry, the regulatory context and societal context play a less clear-cut role than in the oil and automobile industries as well as in the bank & insurance sector. Although specific determinants can be indicated for some companies as an explanation for their climate stance (e.g. CEO's commitment, product mix) a coherent picture does not appear. The heterogeneity in the chemical industry makes it difficult to arrive at generic explanations.

5. THE BANK & INSURANCE SECTOR'S RESPONSE TO CLIMATE CHANGE

This research project on *diverging business strategies towards climate change* purposefully includes the financial sector. The inclusion is not so much connected with financial companies' preliminary internal activities aimed at energy reduction for this sector is well known for its relative low direct emissions. Rather, the specific inclusion is inclined by the high indirect effect banks and insurance companies have on climate change, for example, by financing activities of major emitters of greenhouse gases. This implicates that these intermediaries have the potential to substantially influence the environmental awareness and behaviour of their clients by incorporating specific environmental criteria in financial decision-making (e.g. in risk analysis and tariff structure) or by developing products and services designed to stimulate emission-friendly activities for instance.

The financial sector is reputed to keep up with long-standing traditions. Initially, such a culture does not stimulate a high responsiveness to changing environments. But this does not alter the fact that, primarily in the last decades, major forces did urge financial organisations to become more change-oriented. Main forces relate to trends in internationalisation as well as complex technological developments.

As important clients increasingly internationalised their activities, banks were prompted to respond accordingly, resulting in many large mergers and collaborations in the field. This concentration in the financial sector also stimulated a highly diversified supply of products and services. Traditional banking activities like savings, basic insurance and credit facilities are nowadays extended to asset management, investment banking, and specialised life & health insurance as well as a wide variety of property & casualty insurance.

Another major force, stimulating financial corporations' responsiveness to changing environments, concerns complex technological developments. Today, it is no longer financially sound to make financing and insurance decisions without prior detailed environmental analysis in combination with proper risk management, applying highly (internal) specialised technological knowledge.

The above-described main characteristics of the financial sector are easily recognised in the financial organisations we selected for this study. Most of the selected financial corporations have been confronted with large mergers, have come to play an international role, emphasise sound risk management practises, and offer highly diversified products and services. Table 5.1 presents relevant core data.

In this study we selected five large financial corporations in America and five main European financial institutions. We primarily followed the Fortune Global 500 index and selected – in America as well as in Europe - three registered leaders in commercials & savings, one leader in property & casualty insurance, and one leader in life & health insurance.

Table 5.1 Core data of selected financial corporations.

Name	Fortune Global 500 1999	Head-quarters	Sales 1999 in billion USD	Employees	Major services/products
Bank of America	No.35 C&S ¹	USA	51	155,906	Diversified financial services
Chase Manhattan	No.79 C&S	USA	34	74,801	Diversified financial services
Bank One Corporation	No.127 C&S	USA	26	86,198	Diversified financial services
American International	No.76 P&C ²	USA	41	55,000	Insurance and other diversified banking services
Prudential Insurance Co of America	No.71 L&H ³	USA	27	59,530	Insurance and other diversified banking services
Credit Suisse	No.37 C&S	CH	49	63,963	Insurance and other diversified financial services
Deutsche Bank	No.42 C&S	DL	59	93,232	Diversified financial services
HSBC	No.47 C&S	UK	39	146,897	Diversified financial services
Allianz	No.23 P&C	DL	74	113,584	Insurance & asset management
ING Group	No.28 L&H	NL	62	86,040	Insurance and other diversified banking services.

¹ Fortune Global 500: Banking: Commercials & Savings

² Fortune Global 500: Insurance: Property & Casualty

³ Fortune Global 500: Insurance: Life & Health

Source: Fortune, 2000

5.1 Generic trends in USA and Europe

In the financial sector strategic responses to climate change are very dissimilar for European headquartered companies as compared to American domiciled corporations. American financial institutions do not communicate their stances on climate change in publicly open corporate documents and thus seem to be ignorant of the topic. Although the Bank of America is the only American-based company to slightly mention the topic of climate change it does so only to state explicitly that the Bank of America does not have a specific policy on climate change. In contrast, large European financial institutions have recently come to communicate actively on climate change. For the time being, Anglo-Saxon HSBC is the only European-headquartered company to adopt a moderate position, communicating general environmental policy intentions.

European banks and insurance companies have adopted positive stances towards climate science and the Kyoto Protocol, underlining the importance of future insurability, sound environmental risk management and long-term economic health. These positive stances are also reflected in industry association membership, and co-operative programs with local governments and NGOs.

In the 1990s, European financial institutions made a start at measuring and monitoring internal CO₂ emissions and setting targets on energy reduction in their country of domicile (HSBC only communicates an intention to do so). In this regard, banks and insurers incorporate energy efficiency measures as well in purchase decision-making, evaluating supplier performance.

Most European financial corporations also look for climate change related opportunities in new products and services. Banks and insurers develop products and services, which stimulate emission-friendly activities (e.g. green mortgages) and incorporate energy efficiency measures in financial decision-making (e.g. in risk analysis and tariff structure). In addition, Credit Suisse, Deutsche Bank and ING are seriously discussing emission trading as a possible future business. Deutsche Bank is most advanced, participating in the newly founded Prototype Carbon Fund.

5.2 Economic situation and market positioning

In communicating business values, American financial institutions strongly communicate their social and community engagement as a major competitive element in their market positioning. In contrast, environmental issues hardly play a role in their market positioning let alone climate change. Even American International Group, positioning itself as a leading provider of environmental insurance programs, does not pay attention to climate change. Furthermore, Bank of America explicitly states to have no sustainability or climate change policy. Yet, the specific position of Bank of America needs a closer observation because recently this bank does state a belief that environmental protection is an integral component of doing good business and it does communicate its intentions to establish an energy baseline and report on future progress. A possible explanation for these seemingly paradoxical statements may be related to Bank of America's established interests in commercial lending activities to the auto and oil & gas industries. In this setting, Bank of America may think it wise not to address the topic of climate change because some clients may still take an opposing attitude (see specific analysis of the autos and oil & gas industries).

In communicating business values, European financial corporations pay attention to environmental issues and recently show their growing interests in climate change.

Besides, European banks and insurers highlight economic consequences of environmental protection and long-term economic health of reducing harmful emissions. In phrasing the importance of climate change, European financial institutions point at negative financial effects of extreme weather events and future insurability. Next to elements of risk management, attention also shifts to internal energy efficiency and emissions as well as to climate change related opportunities (e.g. green mortgages for energy efficient buildings). Moreover, the European regulatory and societal context often stimulate banks and insurers to engage in environmental and climate change friendly activities, such as the economic incentive of the Dutch government to stimulate Green Funds (by means of fiscal facilities), supporting investments in renewables, amongst others.

In conclusion, European banks and insurers recently made a start at addressing relevant economic threats and opportunities of climate change, whereas their American counterparts are not yet publicly communicating on the topic and seem to have no vision on the role financial institutions (could) play to combat greenhouse gases emissions.

5.3 Regulatory context

From the previous section it can be noticed that Trans-Atlantic differences in current business strategies on climate change can not be related to differences in historical economic activities of banks and insurers. On both sides of the Ocean financial institutions have been active in insurance activities in some degree and so far only European banks and insurance companies actively address and communicate on climate change related financial risks of property and casualty insurance. In contrast, differences in the regulatory context and the societal context seem to have highly influenced the Trans-Atlantic divergence in observed strategic responses to climate change. The European regulatory and societal context has influenced the extent and speed of financial institutions' actions, investigating main consequences of climate change and exploring appropriate business strategies.

The section of this report devoted to the oil industry's response to climate change already described the historical regulatory and general political context in America as compared to Europe. By and large, the financial sector's response to climate change can be connected with the oil industry's response.

As previously described, America has been confronted with issue-specific lobbying associations, representing energy-intensive sectors, as well as with a large public discussion on the reliability of climate science. As a consequence, American banks and insurers have been reluctant to address the topic of climate change. And still at this moment, American banks and insurers do not show an active interest.

On the other hand, no lobbying associations opposed to climate change policies were formed in Europe. Also, climate science is less disputed and from a precautionary perspective European political institutions search for voluntary agreements with the business community. In this respect, most European banks and insurers are now challenged to take a look at their internal energy efficiency and their CO₂ emissions and to actively search for reductions. The above-indicated co-operative political context may also encourage European banks and insurers to increasingly stimulate the environmental (and climate change) awareness and behaviour of their clients and suppliers. For example, an environmental consultation structure in the Netherlands, representing amongst others the financial business community and the Environmental Ministry, has started to explore opportunities in this area.

5.4 Societal context

In America, as well as in Europe we can witness coherence in the climate change related political and societal context of banks and insurers and the resulting attitude and actions of these corporations in dealing with climate change.

Regarding environmental and climate change issues, general societal awareness and engagement is relatively low in America. This general societal environmental ignorance is reflected in corporate policy and strategy of financial corporations. Contrary to their high social engagement, American banks and insurance hardly pay attention to environmental and climate change issues. As already indicated in section 5.2, even American International Group, positioning itself as a leading provider of environmental insurance programs, does not address the topic of climate change. Also, Bank of America explicitly states to have no sustainability or climate change policy. The paradoxical position of Bank of America (described in 5.2) can be exemplified by pointing at its participation in United Nations Environmental Program's (UNEP) Financial Services Initiatives without signing the UNEP Statement by Financial Institutions on the Environment & Sustainable Development.

As compared to America, general societal awareness and engagement regarding environmental and climate change issues has been growing in Europe in the last decades. Moreover, this general societal environmental awareness is reflected in corporate policy and strategy of financial corporations. European-headquartered financial corporations communicate their societal environmental relationships as well as their preliminary (intended) strategic response to climate change. In this respect, it is interesting to report that most European based financial corporations intend to expand their environmental policy internationally. Some banks and insurers have begun to communicate that it is important to address climate change and many other environmental issues at an international level as these problems will require international approaches and solutions.

In sum, both a relevant political and societal context stimulate European banks and insurers to address environmental issues and climate change, whereas their American counterparts seem to be deprived of such a relevant context and as a consequence are reluctant to take up this topic.

5.5 Conclusions

In this particular study on *diverging business strategies towards climate change*, devoted to the financial sector, we can draw four major conclusions.

First, a strong focus on shareholder value is common good in the financial sector. Besides the general financial attention, American banks and insurance companies display a high social engagement. For example, community involvement and philanthropic activities are much communicated. However, an environmental engagement let alone special attention towards issues on climate change is hardly noticeable. Instead of only communicating a social engagement, European financial institutions pay additional attention to environmental issues and have recently taken up climate change related issues.

Second, American banks and insurance companies are mostly ignorant to climate change related issues, whereas European financial institutions show a carefully positive to positive attitude. Most European banks and insurance companies have developed climate change related business strategies by setting internal energy targets, by developing new products (e.g. green mortgages) and services (e.g. energy advice services) and by researching and pro-acting (e.g. Prototype Carbon Fund) on future emission trade systems.

Third, it is important to understand the relevant context of the environmental awareness and behaviour (e.g. strategies developed) of European banks and insurers for this may at least partly explain the differences with their American counterparts. In Europe the environmental engagement of financial institutions is backed-up by well-developed consultation structures and voluntary environmental agreements between national government, financial institutions and financial branch organisations. In addition, the consultation structures are also well developed at the European level (e.g. UNEP's Financial Services Initiatives located in Geneva). It is highly plausible to suggest that the important context of European banks and insurers has stimulated the development of environmental business strategies in general and the business strategies towards climate change in particular. It is also plausible to suggest that a relevant environmental context for financial institutions is missing in America and that this may be the cause for the recorded divergence in business strategies towards climate change.

Finally, convergence in Trans-Atlantic strategic responses to climate change may come into vision when European-based financial corporations extend their environmental and climate change policy internationally and when main emitters of greenhouse gases in

America take a neutral to positive stance on climate change and start co-operating in a relevant societal and political context. In this respect, Bank of America may be taking a first step in this direction as it recently made a very careful move to prudently look for ways of integrating environmental issues in doing business.

6. CONCLUSIONS

Table 6.1 recalls basic characteristics of the four sectors under review. Indeed, there are substantial differences between the sectors. Oil and automobile corporations are among the biggest companies in the world, whereas chemical companies and banks are somewhat smaller. Some sectors are process oriented (oil, chemicals), while automobile manufacturers are product oriented and financial corporations are service oriented. Also, the direct contribution to climate change differs substantially. Due to their strategic position in the world economy, indirect contributions to climate change, during the Product Life Cycle, is important for all sectors. Automobile producers, for example, influence the energy efficiency of the transport system, while bank & insurance companies are (potentially) able to put environmental demands on their clients.

Table 6.1 Characteristics of four sectors of industry.

Industry	Position in Fortune Global 500	Type of industry	Direct contribution to climate change	Indirect contribution to climate change
Oil	3 till 86	Process	Large	Large
Automobile	1 till 19	Product	Medium	Large
Chemicals	55 till 266	Process	Large	Large
Bank & insurance	23 till 127	Service /Product	Small	Large

Table 6.2 presents overall results for the four sectors of industry. With the aim to assess climate strategies of companies, we distinguish between the following generic strategies:

- Reactive (denial of climate problem; adversary to policy measures);
- Passive (no explicit stances on climate policy; ‘wait and see’);
- Active (follower; ‘no regret’ policies; improvement of energy efficiency);
- Pro-active (development of new technologies; development of new policy instruments).

As can be seen in Table 6.2, developments of climate strategies are rather sector-specific.

In most sectors, namely the oil, automobile and banks, European corporations tend to be more active than their US counterparts. This is in line with climate strategies at government levels. However, this does not apply to chemical companies where USA corporations are both among the most pro-active and the most reactive companies.

The automobile industry shows convergent strategies after Kyoto, whereas in the other sectors US-European convergence in strategies is not clearly visible.

Table 6.2 Climate strategies in four sectors of industry.

Industry	Strategies in USA	Strategies in Europe	Convergence USA-Europe 1997-2000
Oil	Reactive>Active	Active/Pro-active	Minor
Automobile	Reactive>Active	Active	Yes
Chemicals	Reactive or Pro-active	Passive/Active	No
Bank & Insurance	Passive	Active/Pro-active	No

In the oil and automobile industries, each company has developed stances on climate strategies, on the Kyoto agreements and on its implementation. In contrast, many companies in the chemical sector and bank & insurance so far show an 'air of neglect'. For them, Kyoto and its mechanisms seem to be far from daily reality.

Why do corporations behave like they behave? According to our research, corporate strategies are highly determined by a combination of a specific market situation in their home country and access to alternative technologies. This overall conclusion applies to both the oil, the automobile and the chemical industry.

Also regulatory and societal context play a role in shaping business' climate strategies. US policy making can be characterised as legalistic based on technical arguments, while European policy making shows a more consensual style based on political arguments. Europeans tend to be more concerned about environmental issues. Americans, by contrast, are held to be more individualistic, more concerned about their lifestyles than the environment and more ideologically adverse to regulation. As a result, US-based companies tend to be more adversarial to climate science and policy instruments, especially to mandatory emission controls.

Finally, we present some sector-specific conclusions.

As for the oil and automobile industries, researchers expect further convergence in future. Reasons for convergence are that the companies involved are large multinationals engaged in each other's markets, actively involved in a process of globalisation and increasingly participating in common institutional structures. As for the chemical and financial sectors, no clear statement about future convergence can be made.

Inclusion of non-CO₂ gasses in the Kyoto Protocol offers opportunities to make new deals with some sectors of industry. As an example, several chemical corporations are able to show remarkable successes in greenhouse policies by reducing emissions of N₂O and HFCs.

7. RECOMMENDATIONS

Based on conclusions in Chapter 6, we can make a number of policy recommendations.

First of all, it is very important to look beyond industry's averages presented by industrial associations. Corporate strategies, even within one country, can be quite different indeed. Corporations with pro-active climate strategies offer opportunities to start 'Kyoto networks'.

Connected to the first point, we recommend that national governments start working with major enterprises and branch organisations on climate change issues. An early commencement with voluntary agreements has the potential to raise awareness and to gain necessary preliminary experiences in energy reduction for instance. In addition, this will enhance future implementation of climate change policy measures for measuring and monitoring of greenhouse gas emissions, a first and important step to be taken in the process of mitigating global climate change.

The chemical and financial cases show how important it is to develop workable versions of Kyoto policy mechanisms. As soon as abstract discussions transform into practical solutions, it will be more difficult for corporations to continue a 'wait and see' strategy.

The next policy recommendation is that policy implementation should stimulate a sector specific broadening of technological opportunities by stimulate the diffusion of technological knowledge. Access to alternative technologies lessens resistance and can even bring about a change in strategies; see the automobile case.

We round off with some sector-specific recommendations.

It is clear that the oil and automobile corporations offer a large potential for innovations, both in the technical sense and in the sense of policy instruments. It is important to tap experiences of forerunners in these sectors, as they can be useful not only for companies in their own sector, but also for climate policies in general.

Especially related to the chemical industry, the opportunities of non-CO₂ greenhouse gases must be fully exploited. Policy packages which include for example N₂O and HFCs offer welcome opportunities to enlarge the scope of market based instruments and/or voluntary agreements.

As for the financial sector, it is advisable to explicitly involve the banking and insurance companies in voluntary agreements and other early actions. Although banks and insurance

companies are not directly among the major emitters of greenhouse gasses, these intermediaries can indirectly reach and influence the awareness and behaviour of a large audience. Not only are they able to stimulate and influence the behaviour and awareness of clients by developing new products (e.g. green mortgages for energy efficient buildings) or by using differentiated tariffs in credit facilities (e.g. lower interest rates on loans for renewable energy projects), but also can they influence awareness and behaviour of suppliers (e.g. purchasing energy efficient computers).

Moreover, we recommend that the banking and insurance sector be engaged in developing, researching, and implementing climate change policy measures, such as the development and research on emission trading systems or the implementation of fiscally facilitated green funds in the Netherlands. Only by deploying highly specialised financial knowledge and expertise of the financial sector, will economically feasible and efficient measures/systems for implementing climate change policy take a satisfying shape.

With regard to future research, five types of activities can support policy implementation in the business world :

1. Monitor climate strategies in oil, automobile, chemical and financial sectors on developments and convergence;
2. Enlarge the scope of research to other relevant sectors like electricity generation, basic metals, paper industry;
3. Investigate climate strategies of Asian multinationals *vis-à-vis* their US and European counterparts;
4. Initiate more in-depth case studies on business' internal triggers for changes in climate strategies;
5. Investigate the role of branch organisations and ad-hoc organisations like GCC, WBCSD. Do these organisations produce their own momentum in climate discussions, or are they just a mouthpiece of dominant members?

A better understanding of business' options and motives is indispensable if politicians want to secure active participation of corporations in the implementation of the Kyoto Protocol.

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APPENDIX 1. QUESTIONNAIRE USED IN CASE STUDIES

Compiled by: d.d.

Company name:

Website name:

Environmental reports are available since year:

Product/process strategy (core business)

1. Does the company have generic strategies to combat greenhouse gas emissions?

Categories: yes or no, starting year and what and why if possible. Issues:

- a. Initiatives to track/report corporate emissions
- b. quantitative targets to reduce corporate emissions
- c. product line acquisitions or diversifications
- d. implementation of specific investment criteria
- e. uniform policies for all subsidiaries in USA and Europe?

2. Does the company have sector specific strategies to combat greenhouse gas emissions?

Listed issues are examples only; quote examples and what and why if possible.

Issues for the oil industry: investments in alternative energy sources (a), investments in alternative fuels/diversification (b). PM for WIMM

Issues for the automobile industry: alternative fuels? Change in transport system? Etc.
PM for U-Mass.

Issues for the bank & insurance sector: new products (a), alternative risk assessments for certain types of credit (b).

Issues for the chemical industry: investments in alternative products (a), investment in alternative fuels (b).

Political/PR strategy

3. Does the company take a public stance (in external documents and other external information) towards the following issues on climate change and how can this stance best be phrased?

Present quotes and try to assess stance: negative/do not agree at all (1) - slightly negative/probably not true (2) - indifferent/neutral/no stance (3) - slightly positive/positive attitude but do not know how to act (4) - positive/ideas to contribute positively (5). Issues:

- a. Climate science
- b. Kyoto protocol
- c. Economic consequences of reductions

4. Does the company take a public stance (in external documents and other external information) towards the following policy mechanisms to curb climate change and how can this stance best be phrased?

Present quotes and try to assess stance: negative/do not agree at all (1) - slightly negative/probably not (2) - indifferent/neutral/no stance (3) - slightly positive/positive attitude but do not know how to act (4) - positive/ideas to contribute positively (5). Issues:

- a. National emission caps for sectors of industry
- b. Emission trading
- c. Joint implementation

- d. Clean development mechanism
 - e. Voluntary Agreements between sectors of industry and governments
 - f. Early action proposals for measures implemented before 2008
5. Are there recent changes in the following fields?
Categories: yes or no, year of change and what and why if possible.
- (a) industry association membership
 - (b) cooperative programs with government agencies
 - (c) cooperative programs with NGOs

APPENDIX 2. OVERVIEW TABLE FOR OIL INDUSTRY

1a) Monitoring of Greenhouse gas emissions

Topic ↓	Name of company →	BP	Exxon Mobil	Shell	Texaco
Energy efficiency		Yes	Yes	Yes	Yes
CO ₂		Yes	Yes	Yes	Yes
Other substances (N ₂ O, CFCs, HFC, CH ₄)		Yes	Yes	Yes	Yes
Renewable energy		Yes	No	Yes	No
Kyoto basket		?	?		

Remarks:

BP and Shell were the earliest to be active in (externally audited) monitoring.

Texaco Started to collect emission data after looking at BP and Shell approaches; renewables policy may emerge with Texaco's new approach to climate change in early 2000.

“Renewable energy” here means that renewable energy sources used by the company are tracked as part of system to monitor total energy consumption and emissions.

Exxon Mobil employs cogeneration in some internal facilities to reduce energy use and emissions.

1b) Quantitative targets to reduce greenhouse gas emissions

Topic ↓	Name of company →	BP	Exxon Mobil	Shell	Texaco
Energy efficiency		Yes?	No	Yes?	No
CO ₂		Yes	No	Yes	No
Other substances (N ₂ O, CFCs, HFC)		Yes	No	Yes	No
Renewable energy		No	No	No	No
Kyoto basket					

Remarks:

BP & Shell have specific quantitative targets for emission reductions, both announced in 1998; Shell and BP have specific targets for investments and sales in renewable energy, but not in terms of CO₂ reduction. Shell publicly announced its intention to exceed Kyoto target.

Texaco No information found.

Exxon Mobil: does not have quantitative targets, but does have significant internal energy management systems that result in investment in economically justified improvements in efficiency.

4) Public stance on policy mechanisms to curb climate change

Topic ↓	Name of company →	BP	Exxon Mobil	Shell	Texaco
National emission caps		Yes	No	Yes	?
Emissions trading		Yes	No	Yes	Yes
Joint implementation		Yes	No	Yes	Yes
Clean Development Mechanism			No	Yes	Yes
Voluntary agreements			Yes		Yes
Flexible mechanisms		Yes	No	Yes	Yes
Credit for Early action before 2008		Yes	No	Yes	?

Remarks (see also under 1b):

Exxon Mobil does not currently support emissions trading, CDM or JI since they only function under national emissions caps and implementation of the Kyoto Protocol which the company does not support, but says it can develop systems if regulatory frameworks emerge. Exxon Mobil does support tax reform and elimination of barriers to deployment of new technology that may result in substantive economically justified investments.

BP and Shell support emissions trading, have installed such programmes themselves with specific targets. BP CEO said that JI is in its infancy, but has great potential (forestry projects and discussions on future projects). Shell considers all options (has e.g. its own internal CDM programme), but has preferred emissions trading so far (current CDM flows are considered inadequate for example).

Texaco's current position is that market-based solutions (such as emissions trading) are better than the Kyoto Protocol; does not intend to set up an internal trading system (as opportunity costs are too high). Is optimistic about CDM and JI; it has set aside money for reforestation, sequestration is seen as good alternative for addressing CO directly at source.

5a) Industry association membership

Topic ↓	Name of company →	BP	Exxon Mobil	Shell	Texaco
WBCSD		Yes	No	Yes	Yes
International Climate Change Partnership		Yes	No	No	No
Global Climate Coalition		No	Yes, till 2000	No	No
Pew Centre		Yes	No	Yes	No

5b) Co-operative programs with governmental agencies

Topic ↓	Name of company →	BP	Exxon Mobil	Shell	Texaco
California Fuel Cell Partnership					Yes
EPA Climate Wise Program		Yes	No	No	No
EIA Voluntary GHG reporting		Yes	No	No	No

5c) Co-operative programmes with NGOs

Topic ↓	Name of company →	BP	Exxon Mobil	Shell	Texaco
Ceres principles		No	No	No	No
Project with EDF on emissions trading		Yes	No	No	No
Safe Climate, Sound Business (with WRI)		Yes	No	No	No

APPENDIX 3. OVERVIEW TABLE OF AUTOMOBILE INDUSTRY

1a) Monitoring of Greenhouse gasses emissions

Topic ↓	Name of company →	GM	Ford	Daimler- Chrysler	VW
Energy efficiency		Yes	Yes	Yes	Yes
CO ₂		Yes	Yes	Yes	Yes
Other substances (NO _x , CFCs, HFC, O ₃ , PM)		Yes	Yes	Yes	Yes
Renewable energy		Yes	Yes	Yes	Yes

Remarks:

Renewable energy: companies refer to the potential for methanol, hydrogen, and compressed natural gas to be obtained from renewable sources.

GM reports plant and vehicle emissions under EIA's Voluntary Reporting of Greenhouse Gasses Program.

Ford In 1999, Ford's Corporate Citizen Report follows the Global Reporting Initiative's Sustainability Reporting Guidelines. Reporting on manufacturing operations and vehicles.

All vehicle companies have to meet various national NO_x, hydrocarbon, carbon monoxide, and PM emission standards, for air quality, not climate reasons.

All companies have phased out CFC use as refrigerant for air-conditioning.

1b) Quantitative targets to reduce greenhouse gas emissions

Topic ↓	Name of company →	GM	Ford	Daimler- Chrysler	VW
Energy efficiency		N/A	Yes	Yes	Yes
CO ₂		Yes	Yes	Yes	Yes
Other substances (N ₂ O, CFCs, HFC, SO ₂)		N/A	Yes	Yes	Yes
Renewable energy		N/A	No	No	No

Remarks:

European Automotive Manufactures Association (ACEA) agreement to cut CO₂ emissions by 25% from 1995 baseline by 2008, or 140 grams per kilometer for EU vehicles. Association of German Automobile Manufactures (VDA) agreement to reduce fuel consumption by 25% from 1990 baseline by 2005.

Ford reduce energy consumption by 2.25% in 2000. In 2000, announced that it is planning to improve SUV fuel economy by 25% by 2005. Targeting NOx and SOx reductions beyond mandatory requirements for non-climate change purposes. For example, in 2000 Ford began a progressive rollout of low emission powertrains that meet the European Union's proposed Stage IV emissions standards (50% lower than Stage III) five years before they become law. In Australia, Ford supported the Greenhouse Climate Change Challenge, which includes voluntary plant and vehicle CO₂ reductions.

GM ACEA agreement for Europe facilities. GM responded to Ford's 25% improvement target and announced it would achieve similar goals.

Daimler-Chrysler Deutsche Umwelthilfe (German Environmental Aid) agreement to cut average fuel consumption by 0.2 liters/100 km a year; ACEA agreement; VDA agreement. Manufacturing plants and facilities have targets to reduce paint spray emissions and CO₂ emissions.

VW ACEA agreement; VDA agreement; renewable fuels. Reduction of paint spray emissions

1c) Product line acquisitions or diversification

1d) Specific investment criteria for reduction of greenhouse gas emissions

Topic ↓	Name of company →	GM	Ford	Daimler-Chrysler	VW
Specific criteria available		N/A	N/A	N/A	N/A
Data environmental investment available		No	No	Yes	Yes

Remarks:

Daimler, VW Environmental Statistics Act requires annual calculation of environment-related operating costs and investments.

1e) Uniform policies for all subsidiaries

Topic ↓	Name of company →	GM	Ford	Daimler-Chrysler	VW
Uniform Policies		N/A	Partial	Yes	Yes
Data environmental investment available		No	Yes	Yes	Yes

Remarks:

Ford: Reporting includes Ford, Lincoln, and Mercury brands. Will include other Ford brands in the near future. Ford issues worldwide automotive recycling guidelines to its suppliers and engineers.

GM and Ford: ACEA-EU CO₂ emissions goals apply to Europe only.

Daimler-Chrysler: Corporate-wide Environmental Protection Guidelines; Environmental Synergy Projects (ESP); integration of two companies complete.

VW “Environmental protection is integrated into every sector of the company.”

2) Does the company have sector specific strategies to combat greenhouse gas emissions?

The three large US producers joined the Partnership for a New Generation of Vehicles in 1994, a joint program, partially government funded, to develop 80 mpg car, without compromising size, safety, performance. PNGV will result in production-ready vehicle, based on low-weight, advanced diesel CIDI technology. Companies do not commit to production, and are sceptical of market potential if low-emission vehicles involve trade-offs. Also formed the Advanced Battery Consortium.

GM: Electric vehicle introduced for sale in 1996 (but primarily to meet non-carbon emission standards). In 1998, announced a new version of EV1 with NMH batteries, range up to 150 miles. Alliances with Exxon and Arco for fuel reformer technology for fuel cells, and JV with Giner, Inc., for fuel cell technology. Development work on hybrids, which are seen as best short-term solution. Will have 80 mpg hybrid electric car ready for production by 2001 and a fuel cell car ready for production by 2004, but no commitment to production. In 1998, alliance with Amoco to research cleaner fuels, especially diesel. Large expansion of diesel engine production. In 1999, announced a five-year partnership with Toyota to develop cars powered by fuel cells and other non-traditional-fuel technologies. In 1999, made a long term deal with Alcan for aluminum for lighter components.

Ford: Main focus is fuel cells, alternative fuels, improving performance of conventional style cars, including SUVs and trucks. In December 1997, Ford invested \$420 million in the Ballard Fuel cell JV with Daimler. Given that Ford relies on large SUVs and trucks for majority of profits, its environmental commitment is largely based on reducing conventional emissions (SO_x, NO_x) from them. Environmental focus is meeting California's LEV,

SULEV standards ahead of time. . July 2000 announced will increase fuel efficiency of SUVs by 25% over 5 years. Since early 1990s, investment in alternative fuels, methanol, ethanol, CNG, LPG. Some electrical vehicle conversions – e.g. Ford Ranger. In 1999 it acquired small electric car manufacturer TH!NK in Norway for European market, US by 2002. In 2000, TH!NK became brand for all alternative vehicles. Ford has JVs for diesel engines with Peugeot and Navistar. Ford was the first US company to commit to producing a hybrid vehicle – an SUV by 2003.

Daimler-Chrysler: May 1998: merger between Daimler and Chrysler, perhaps fueled by need for economies of scale with development of new technologies. In March 2000, Daimler-Chrysler and Mitsubishi Motors Corp. announced a capital and business alliance, to share technologies. Daimler needs access to smaller cars to meet emission targets.

Daimler has been the leader in fuel cell research, with its 1997 investment of approx. \$400 million in Ballard, and plans for commercial production by 2004. Says it will spend \$1.4 bn by 2004. Daimler has gas-to-diesel technology for clean diesel, and heavy investment in advanced diesel. Daimler also launched the Smart car in Europe in 1998, a radical small, lightweight, high efficiency vehicle, but sales are disappointing. Mobility project for broader transportation system.

Chrysler has developed diesel-electric hybrids through PNGV. In March 2000, Daimler-Chrysler showed an electric-diesel car that gets 72 miles to the gallon and costs just \$7,500 more than a conventional \$21,000 Dodge Intrepid. In March 2000, Daimler-Chrysler and Mitsubishi Motors Corp. announced an alliance to share technologies. Daimler needs access to smaller cars to meet emission targets.

VW: Early demonstration of hybrid in 1990. Emphasis on diesel for fuel economy. Goal of “3 litre car” (per 1000 km) by 2000. By 1997, considered leader in the CIDI market. Lupo and Smart City Coupe achieve this in May 2000. Some fuel cell development work. Mobility project.

3) Public stance on climate change

Topic ↓	Name of company →	Ford	GM	Daimler- Chrysler	VW
Climate science		2	3	4	4
Kyoto Protocol		1	2	4	4
Economic consequences		2	3	4	4

Remarks:

Pre-Kyoto, all three large US companies took very strong positions against mandatory emissions controls, through the Global Climate Coalition, the AAMA, and individually. They challenged the scientific basis for action and argued that economic consequences of controls would be severe.

GM: By end of 1997, accepted that “there is cause for concern”, need for alternative technologies, but remained opposed to Kyoto Protocol. By Feb. 1998, says “business can benefit from addressing the challenge of potential climate change”

Ford: Company sends mixed messages on the science: Trotman in Nov. 1997 agreed that CO₂ levels were increasing, but argued that no agreement existed on causes or effects. William Clay Ford, while still head of board finance committee, in Oct. 1997, says global warming is a real threat. Oct 1998, Ford web site still challenges science and economic. In May 2000, a Corporate Citizenship report accepts that SUVs contribute more to global warming.

On the economics, William Clay Ford says (Oct. 1998) "preserving the environment is not only the right thing to do, it's the best thing to do from a long-term business perspective." In May 1999, W. C. Ford says marketplace will demand clean cars.

Daimler-Chrysler: Chrysler, pre-merger, was most outspoken critic of emission controls. Daimler, like other European companies, officially accepted climate science, despite some internal skepticism.

VW: no public challenge to climate science or Kyoto Protocol, despite some internal skepticism.

4) Public stance on policy mechanisms to curb climate change

Topic ↓	Name of company →	GM	Ford	Daimler-Chrysler	VW
National emission caps		No	No		
Emissions trading		Yes	Yes		
Joint implementation		N/A	Yes		
Clean Development Mechanism		N/A	Yes		
Voluntary agreements		Yes	Yes	Yes	Yes
Flexible mechanisms		Yes	Yes	Yes	Yes
Early action before 2008		Yes	Yes	Yes	Yes

Remarks:

GM supported 50c/gallon gasoline tax

VW Legislation can help coordinate environmental efforts.

5a) Industry association membership

Topic ↓	Name of company →	Ford	GM	Daimler-Chrysler	VW
WBCSD		Yes	Yes	No	Yes
International Climate Change Partnership		No	Joined 1998	No	No
Global Climate Coalition		Left 1999	Left 2000	Left 2000	
Pew Centre		No	No	No	No
Other					

Remarks:

Daimler-Chrysler Not listed on WBCSD's membership list.

5b) Co-operative programs with governmental agencies

Topic ↓	Name of company →	Ford	GM	D-C	VW
EPA Risk Management Plan			Yes		
EPA Climate Wise Program		Yes	Yes		
EUCAR		yes	Yes	Join 1999	Join 1999
European Covenants		Yes		Yes	Yes
PNGV		Yes	Yes	Yes-Chrysler	

Remarks:

Ford Only Ford’s Twin-Cities assembly plant is listed as a member. Trotman advocated large voluntary programs with US Fed. Govt in Nov 1996.

Daimler and other European mfrs join a Euro 350 million research project under EUCAR for fuel efficient vehicles in July 1999.

European Community’s Eco-Management and Audit Scheme (EMAS), is similar to ISO 14001.

German Automotive Industry Association’s (VDA) standards for environmental reporting.

Daimler-Chrysler Audits suppliers for compliance with VDA standards; supports EU’s Environmental Management and Audit Scheme (EMAS); will roll out ISO 14001 compliance.

VW Complies with EU EcoAudit Regulation and ISO 14001. Began compliance with EMAS in 1995.

5c) Co-operative programmes with NGOs

Topic ↓	Name of company →	Ford	GM	Daimler	VW
WRI Safe Climate Sound Business			Joined 1998		
Community Advisory Panel					
Ceres Principles		Joined 1994	Joined 1994		
Other					Imung

Remarks:

GM endorsed Global Sullivan Principles. Works with The Nature Conservancy

Ford endorsed Global Sullivan Principles. “Reaching out to” World Resources Institute and World Business Council for Sustainable Development. Ford has worked with the Conservation International Foundation (CI) since 1995, in programs in the Brazilian Amazon, the Atlantic Forest, and the Pantanal. In 1997 Ford committed over \$5 million to CI’s conservation programs over the next 5 years.

VW works with “imung,” a consultancy for social and ecological innovation.

APPENDIX 4. OVERVIEW TABLE OF CHEMICAL INDUSTRY

1a) Monitoring of Greenhouse gasses emissions

Topic ↓	Name of company →	Du Pont	Dow Chemical	Allied Signal	Bayer	BASF	ICI
Energy efficiency		Yes	Yes	NA	Yes	No	Yes
CO ₂		Yes	Yes	NA	Yes	Yes(partly)	Yes
Other substances (N ₂ O, CFCs, HFC)		N ₂ O, CFCs, HFCs	CFCs, HFCs	NA	N ₂ O	N ₂ O, CFCs, HFCs	CFCs
Renewable energy		Yes	No	NA	No	No	No
Kyoto basket		Yes	Yes	NA	No	No	Yes

Remarks:

Du Pont The most complete information compared with another companies

Dow chemical Dow uses 1988 as baseline for reporting. In period 1988-1998 CO₂ equivalents reduced by 57%, mainly as a result of replacement of CFCs by HFCs. In period 1994-1999 energy efficiency improved by 9%.

Allied Signal HES report is NA. Site “Health, Environment and Safety ” includes only general information.

Bayer Tracks world-wide CO₂ and N₂O emissions.

BASF Presented data of emissions related to 1998 only (impossible to compare in terms of time frame). Presented data is only about energy related CO₂ emissions for BASF Aktiengesellschaft; no data available for BASF Group.

ICI has strategies to combat GHG since 1995. Mainly trying to reduce emissions by the implementation of the energy efficiency measures. Other GHG included in ICI’s Environmental Burden System. 1999 global warming potential decreased by 62% compared to 1995, caused by energy efficiency improvements and CFC replacement.

1b) Quantitative targets to reduce greenhouse gas emissions

Topic ↓	Name of company →	Du Pont	Dow Chemical	Allied Signal	Bayer	BASF	ICI
Energy efficiency		No	Yes	NA	Yes	No	Yes
CO ₂		Yes	No	NA	Yes	Yes (partly)	No
Other substances (N ₂ O, CFCs, HFC)		Yes	No	NA	Yes	No	No
Renewable energy		Yes	No	NA	No	No	No
Kyoto basket		Yes	No	NA	No	No	No

Remarks:

Du Pont presents explicit targets: for 2010 a 65% reduction of CO₂ equivalents compared to 1990 (2000 reduction was 45%); in 2010 10% of energy use from renewable resources.

Dow Chemical has a 1995-2005 target of 20% energy efficiency improvement.

Allied Signal No specific information available.

Bayer 1990-2000 targets were: a 19% improvement of energy efficiency and a 30% decrease of CO₂ load per sales volume. The 1990-2005 target is a 40% decrease of combined CO₂ and N₂O emissions.

BASF As for generic strategy only energy saving in general is mentioned.

ICI Hardly possible to compare relative figures presented by company with absolute targets in Kyoto Protocol. The 1995-2000 target of 10% energy efficiency improvement will be met. No targets available as yet for the period after 2000.

1c) Product line acquisitions or diversification

Du Pont Yes, they sold the oil company Conoco and invest heavily in life sciences and biotechnology.

Dow Chemical No specific information found.

Allied Signal Not. In 1994 they acquired European Fluorochemical from AKZO Nobel. They continue to invest in existing product lines which could be potential sources of GHG emissions.

Bayer Not. They invest in their existing four core businesses. Divestment in Erdoelchemie (feedstock) and Agfa-Gevaert (photo, film).

BASF Not. They continue to invest in all product lines from oil/gas production till pharmaceuticals, which could be potential source for GHG emissions.

ICI Yes. ICI has strategy to move from bulk chemicals to speciality chemical business. ICI sold it's Polyester operations and 2 Industrial Sites, which potentially could contribute to volume of GHG emissions.

1d) Specific investment criteria for reduction of greenhouse gas emissions

Topic ↓	Name of company →	Du Pont	Dow Chemical	Allied Signal	Bayer	BASF	ICI
Specific criteria available		Yes	Yes	Yes	Yes	No	Yes
Data environmental investment available		Yes	No	No	Yes	No	No

Remarks:

Du Pont reducing emissions of nitrous oxides and fluorochemicals; improving energy efficiency, pollution prevention.

Dow Chemical Invest in cogeneration. Following the vision of eco-efficiency, the Dow 'eco-innovation compass' includes energy intensity of products as one of six criteria for product development.

Allied Signal Developed non-ozone depleting AZ-20 refrigerant as replacement for HCFC-22.

Bayer Reducing nitrous oxides and improving energy efficiency. Bayer provides most complete information about capital expenditures and annual operating expenses.

BASF only generic R&D data available

ICI Partly. Mostly related to the energy efficiency programmes

1e) Uniform policies for all subsidiaries

Topic ↓	Name of company →	Du Pont	Dow Chemical	Allied Signal	Bayer	BASF	ICI
Uniform policies		No	Yes	Yes	Yes	No	No

Remarks:

Du Pont no stance about uniform policy

Dow Chemical We will meet everywhere applicable governmental or Dow standards, whichever are more stringent.

Allied Signal clear stance

Bayer Uniform policies are much stressed. Bayer is confident in Germany as a base for industry.

BASF uncertain position: ' regional differences make it necessary to set objectives specifically'. Explicit commitment to Europe as 'Europe is and will remain our home market'.

ICI Policy depend on local regulations. ICI consider Western Europe the most unfriendly area for the chemical activity because of social and environmental pressures. ICI has strategy to move their operations to Central Europe and to Asia.

2) Does the company have sector specific strategies to combat greenhouse gas emissions?

Du Pont Yes, a shift towards biotechnology and a target for renewable energy.

Position concerning HFC and PFC production and emissions: production will continue, emissions will be limited by process optimisation and product capture/ recovery.

Dow Chemical Replacement of CFCs as blowing agents by HFCs. Continued investment in cogeneration.

Allied Signal Not. Initiatives to increase energy efficiency, but states that 'power output remains necessary for sustainable economic development'.

Position concerning HFC production and use: HFCs are environmentally safer than their forerunners.

Bayer Investment in Bayer Solar GmbH in Freiberg (former DDR) since 1994. Bayer is biggest European supplier of base materials for photovoltaic energy.

Conversion of own power stations from coal to natural gas.

BASF Not. BASF plans to retain all existing product lines. It has replaced HFC by pentanes as blowing agents.

ICI ICI changed its business portfolio after 1997 from bulk chemicals to speciality chemicals. ICI invests in biotechnology related to renewable feedstock.

Position concerning HFC production and use: Considers HFCs the best replacement for the CFCs and therefore has invested for their production. ICI has no strategy to stop its USA, UK and Japan production of these gasses. ICI provides recovery and recycle schemes for its customers.

3) Public stance on climate change

Topic ↓	Name of company →	Du Pont	Dow Chemical	Allied Signal	Bayer	BASF	ICI
Climate science		5	5	NA	2-3	NA	3
Kyoto Protocol		1	NA	NA	NA	NA	3
Economic consequences		5	4	NA	2	NA	1

Remarks:

Du Pont stance is presented explicit: positive as for Climate science and Economic consequences, negative as Kyoto protocol (the protocol will work negatively because its targets are too aggressive).

Dow Chemical Increase in GHG is a case for concern. Dow envisions responsible policies to curb GHG emissions.

Allied Signal Favours improvements in energy efficiency, opposes restrictions to energy use.

Bayer Follows a no regret policy that concentrates on energy savings. CEO warns that ‘the markets do not always give credits for environmental expenditures’.

BASF No statements found.

ICI Has no clear position towards Climate science. As for Kyoto protocol, ICI takes position of observer, no own stance. ICI worries about unilateral carbon taxes.

4) Public stance on policy mechanisms to curb climate change

Topic ↓	Name of company →	Du Pont	Dow Chemical	Allied Signal	Bayer	BASF	ICI
National emission caps		NA	NA	NA	NA	NA	NA
Emission trading		4	4	NA	NA	NA	5
Joint implementation		NA	NA	NA	NA	NA	NA
Clean Development Mechanism		NA	NA	NA	NA	NA	NA
Voluntary agreements		5	NA	NA	NA	NA	5
Early action before 2008		5	NA	NA	NA	NA	NA

Remarks:

Du Pont Is experimenting with emission trading. Du Pont participates in the voluntary EPA Climate Wise Program. The company states that ‘early actions should be assured by a baseline protection policy or use of crediting systems’.

Dow Chemical Will methodologically investigate other approaches including flexible mechanisms, offsets and alternative energy uses.

Allied Signal No statements found.

Bayer No statements found.

BASF No statements found.

ICI Fully supports initiatives to introduce flexible mechanisms and voluntary agreements. ICI participates in voluntary agreements in UK and Holland.

5a) Industry association membership

Topic ↓	Name of company →	Du Pont	Dow Chemical	Allied Signal	Bayer	BASF	ICI
WBCSD		Yes	Yes	No	Yes (since 1998)	Yes	Yes
Pew Centre		Yes	No	No	No	No	No
Other							Forum for the future

5b) Co-operative programs with governmental agencies

Topic ↓	Name of company →	Du Pont	Dow Chemical	Allied Signal	Bayer	BASF	ICI
EPA Risk Management Plan		NA	Yes	No	Yes	NA	NA
EPA Climate Wise Program		Yes	NA	No	NA	NA	NA
European Covenants		NA	NA	No	NA	NA	NA
Other				EPA Landfill Methane; EU Thermie			

5c) Co-operative programmes with NGOs

Topic ↓	Name of company →	Du Pont	Dow Chemical	Allied Signal	Bayer	BASF	ICI
Community Advisory Panel		NA	Yes	NA	Yes	Yes	NA
Other		MIT; Carter Centre	Community Reception Study; Corporate Environmental Advisory Council	With local communities			Business in the Environment (UK NGO)

APPENDIX 5. OVERVIEW TABLE OF BANK & INSURANCE SECTOR

1a) Monitoring of Greenhouse gasses emissions

Topic ↓	Name of company →	Bank of America	Chase Manhattan	Bank One	AIG	Prudential Am.
Monitoring emissions		No ⁺	No	No	No	No

Topic ↓	Name of company →	Credit Suisse	Deutsche Bank	HSBC	Allianz	ING Group
Monitoring emissions		Yes	Yes	No ⁺	Yes	Yes

Remarks:

Bank of America intends to establish an energy baseline in 1999.

Chase Manhattan has no publicly available corporate environmental information / is not publicly active in monitoring GHG emissions.

Bank One does not publish corporate environmental information / is not publicly active in monitoring GHG emissions.

AIG is not publicly active in internal monitoring of GHG emissions.

Prudential Insurance is not publicly active in monitoring GHG emissions.

Credit Suisse monitors the Group's energy consumption and material flow since 1994.

Deutsche Bank is monitoring power and thermal energy (kwhr) and CO₂ emissions (in tons and per employee) since 1997.

HSBC intends, where practicable, to reduce energy consumption and the use of CFCs and improve energy efficiency (policy statement) There is no concrete information on monitoring GHG emissions.

Allianz published its first Eco balance in 1995. Energy use is measured in MWh and kg CO₂ emissions.

ING is monitoring energy efficiency since 1995. This is stimulated by the long-term Agreement Energy Efficiency (MJA).

1b) Quantitative targets to reduce greenhouse gas emissions

Topic ↓	Name of company →	Bank of America	Chase Manhattan	Bank One	AIG	Prudential Am.
Targets available		No	No	No	No	No

Topic ↓	Name of company →	Credit Suisse	Deutsche Bank	HSBC	Allianz	ING Group
Targets available		Yes	Yes	No	Yes	Yes

Remarks:

Bank of America intends to report on energy progress beginning in 2000 but targets are not yet communicated.

Chase Manhattan does not report on any targets to reduce GHG emissions.

Bank One does not report on GHG emissions reduction targets.

AIG does not report on GHG emissions reduction targets.

Prudential Insurance does not report on reduction targets for GHG emissions

Credit Suisse has set a target for power consumption to be cut to 110 kWh/m² by the year 2004 (1994 is basis).

Deutsche Bank has targets to reduce CO₂ emissions from energy consumption by 5% to 10% (per employee) by the end of 2001. Baseline probably is 1997.

HSBC does not communicate on specific GHG emissions reduction targets.

Allianz has targets for internal energy reduction and for pct of train transport.

ING has targets (2 to 3% reduction each year) for internal energy efficiency (electricity, gas and district heating).

1c) Product line acquisitions or diversification

Topic ↓	Name of company →	Bank of America	Chase Manhattan	Bank One	AIG	Prudential Am.
Criteria available		No	No	No	No ⁺	No ⁺

Topic ↓	Name of company →	Credit Suisse	Deutsche Bank	HSBC	Allianz	ING Group
Criteria available		Yes	Yes	No	Yes	Yes

Remarks:

Bank of America is not active in product line acquisitions or diversifications aimed to combat GHG emissions.

Chase Manhattan does not provide any relevant information.

Bank One is not involved in product line acquisitions or diversifications aimed to combat GHG emissions.

AIG does not report on specific climate change related product-line acquisitions or diversification. However, as a leading provider of environmental insurance programs, AIG has much internal (product-related) knowledge on environmental protection, environmental risk-management and risk-funding mechanisms.

Prudential Insurance is not involved in product line acquisitions or diversifications aimed to combat GHG emissions. However, Prudential has intentions to sell "Gibraltar", which nearly encompasses all environmental (from toxic torts, toxic waste and other hazardous substances) and asbestos-related claims.

Credit Suisse diversified in green activities like the Credit Suisse Equity Fund (Lux) Eco Efficiency and the WinCAT – catastrophe bond.

Deutsche Bank diversifies in some green activities. Deutsche Bank, for example, has invested US \$ 5 million in the World Bank's Prototype Carbon Fund.

HSBC does not provide any relevant information.

Allianz diversifies in some green activities. Allianz has a centre for technical investigation, which for example researches possible substitution of dangerous (climate change) substances.

ING is diversifying into "green activities" for some years. For example, Postbank Green works in the field of the Green Projects Scheme (e.g. renewable energy).

1d) Specific investment criteria for reduction of greenhouse gas emissions

Topic ↓	Name of company →	Bank of America	Chase Manhattan	Bank One	AIG	Prudential Am.
Criteria available		No ⁺	No	No	No	No

Topic ↓	Name of company →	Credit Suisse	Deutsche Bank	HSBC	Allianz	ING Group
Criteria available		Yes	Yes	No ⁺	Yes	Yes

Remarks:

Bank of America just starts to pay attention to cleaner-burning vehicles in its car fleet, and its environmental commitment includes making buildings more energy efficient.

Chase Manhattan does not provide any relevant information.

Bank One does not provide any relevant information.

AIG does not provide any relevant information.

Prudential Insurance does not provide any relevant information.

Credit Suisse uses its energy guiding principles in purchasing and in outsourcing.

Deutsche Bank pays attention to procuring environmentally compatible and, if possible, reusable and recyclable products, and video and teleconferencing are preferred to eliminate business trips.

HSBC intends to favour suppliers and contractors who adopt environmentally sound practices and improve energy efficiency. Specific investment criteria related to GHG emissions reduction are not discussed.

Allianz uses, for example, energy consumption criteria in purchasing decisions.

ING Real Estate, for example, uses a High Energy Performance Norm, which is below the norm included in the Construction Act.

1e) Uniform policies for all subsidiaries

Topic ↓	Name of company →	Bank of America	Chase Manhattan	Bank One	AIG	Prudential Am.
Uniform policies		No	Not appl.	Not appl.	Not appl.	Not appl.

Topic ↓	Name of company →	Credit Suisse	Deutsche Bank	HSBC	Allianz	ING Group
Uniform policies		No ⁺	No ⁺	No	No	No ⁺

Remarks:

Bank of America has just started to look at environmental issues. They have not adopted a sustainability policy but they are committed through their endorsement of the CERES Principles.

Chase Manhattan: question is not applicable (see answers to former questions).

Bank One: question is not applicable (see answers to former questions).

AIG: question is not applicable (see answers to former questions).

Prudential Insurance: question is not applicable (see answers to former questions).

Credit Suisse intends to extent its EMS to sites outside Switzerland and subsidiaries.

Deutsche Bank has a long-term goal to gradually include all subsidiaries.

HSBC has only expressed a general intention to take up on environmental issues.

Allianz environmental policy and measures are largely limited to Allianz SGD.

ING's environmental policy is mainly developed in the Netherlands. ING intends to expand its international environmental policy (also related to CO₂ policy).

2) Does the company have sector specific strategies to combat greenhouse gas emissions?

Topic ↓	Name of company →	Bank of America	Chase Manhattan	Bank One	AIG	Prudential Am.
New products		No ⁺	No	No ⁺	No ⁺	No
Alternative risk assessment		No ⁺	No	No	No	No
Transportation		No ⁺	No	No	No	No

Topic ↓	Name of company →	Credit Suisse	Deutsche Bank	HSBC	Allianz	ING Group
New products		Yes	Yes	No	Yes	Yes
Alternative risk assessment		Yes	Yes	No ⁺	Yes	Yes
Transportation		Yes	Yes	No	Yes	Yes

Remarks:

Bank of America explicitly states that it does not have a climate change policy. However, their environmental commitment includes reducing the environmental impacts of global operations. The promoted online banking services also reduce emissions from travelling but this is not explicitly addressed. Preliminary activities are there but are not strongly communicated and certainly not related to a specific climate change strategy.

Chase Manhattan is not active in developing sector specific strategies aimed at reducing GHG emissions.

Bank One is not active in developing sector specific strategies aimed at reducing GHG emissions. However, a small note was found on tax-oriented investment and advisory activities for (alternative) energy programs qualifying for tax credits (high return and low volatility) under federal tax laws through non-bank subsidiaries (non-customer-oriented) of Bank One.

AIG is not active in developing sector specific strategies aimed at reducing GHG emissions. However, AIG is active in environmental insurance such as property insurance against earthquakes, typhoons and hailstorms. AIG reports a higher frequency of catastrophe losses but does not make specific references to climate change or future expected losses and consequences for insurance policy.

Prudential Insurance is not active in developing sector specific strategies aimed at reducing GHG emissions.

Credit Suisse has come up with climate change related products and incorporates eco-efficiency measures into credit analysis and it reports air and surface travel in calculating its total CO₂ emissions (budget for flights are being limited).

Deutsche Bank is developing sector specific strategies (e.g. Prototype Carbon Fund, CO₂ neutralisation project, tailor-made ecological investment, encouraging public transportation and video conferencing).

HSBC is not developing sector specific strategies aimed at reducing GHG emissions. Intention to incorporate environmental considerations into credit (risk) assessment.

Allianz, for example, stimulates technological innovations in wind energy (analysis of damages) and climate change neutral substances. In risk assessment energy efficiency is incorporated to judge efficient and pro-active management and this is reflected in tariffs. Traffic is highlighted in the env. program and train traffic is being stimulated.

ING is active in developing products that stimulate energy efficiency (e.g. green mortgage), it uses energy norms (environmental credit checklist) in real estate and environmental leasing investments, and specific strategies are developed in the field of commuter traffic, corporate traffic, and freight traffic.

3) Public stance on climate change

Topic ↓	Name of company →	Bank of America	Chase Manhattan	Bank One	AIG	Prudential Am.
Climate science		3/4	3 (ns)	3 (ns)	3 (ns)	3 (ns)
Kyoto Protocol		3 (ns)	3 (ns)	3 (ns)	3 (ns)	3 (ns)
Economic consequences		3 (ns)	3 (ns)	3 (ns)	3 (ns)/2	3(ns)/2

Topic ↓	Name of company →	Credit Suisse	Deutsche Bank	HSBC	Allianz	ING Group
Climate science		5	5	3 (ns)/4	5	5
Kyoto Protocol		5	5	3 (ns)	3	5
Economic consequences		5	5	3 (ns)	5	5

Remarks:

Bank of America explicitly states that it has no climate change policy although the issue is followed and the environmental commitment includes reducing environmental impacts. Kyoto and economic consequences are not addressed.

Chase Manhattan does not take a public stance on environmental issues / climate change issues.

Bank One does not take a public stance on environmental / climate change issues.

AIG does not take an explicit stance on climate change issues. Indirectly, and related to a higher reported frequency of catastrophe losses, AIG must be aware that it is vulnerable for negative consequences of future climate change.

Prudential Insurance does not take an explicit stance on environmental / climate change issues. Indirectly, and related to environmental claims, Prudential states that, given the expansion of coverage and liability by the courts and legislatures in the past, and the potential for other unfavourable trends in the future, the ultimate cost of these claims could increase.

Credit Suisse reports positively on climate science, Kyoto and economic consequences. Efforts by the insurance industry raise public awareness.

Deutsche Bank reports positively on climate science (Prototype Carbon Fund, CO₂ neutralisation project), as well as on the Kyoto Protocol (Prototype Carbon Fund) and the economic consequences (ecological risks are economic risks).

HSBC does not directly discuss climate change issues. Indirectly, CFCs and energy efficiency are addressed.

Allianz does not mention the Kyoto protocol in its environmental report. However, much attention is paid to environmental protection related to climate change (CO₂, N₂O, CH₄, FCKW) and to opportunities for Allianz (e.g. advice, products, research).

ING reports on the importance of developments in the area of CO₂ emissions and climate change, in particular for the insurance sector. ING wants to play a facilitating and stimulating role in this context.

4) Public stance on policy mechanisms to curb climate change

Topic ↓	Name of company →	Bank of America	Chase Manhattan	Bank One	AIG	Prudential Am.
National emission caps		3	3 (ns)*	3 (ns)*	3 (ns)*	3 (ns)*
Emission trading		3	3 (ns)*	3 (ns)*	3 (ns)*	3 (ns)*
Joint implementation		3	3 (ns)*	3 (ns)*	3 (ns)*	3 (ns)*
Clean Development Mechanism		3	3 (ns)*	3 (ns)*	3 (ns)*	3 (ns)*
Voluntary agreements		3	3 (ns)*	3 (ns)*	3 (ns)*	3 (ns)*
Early action before 2008		3	3 (ns)*	3 (ns)*	3 (ns)*	3 (ns)*

Topic ↓	Name of company →	Credit Suisse	Deutsche Bank	HSBC	Allianz	ING Group
National emission caps		3	3/4	3	3/4	5
Emission trading		5	5	3	3	5
Joint implementation		3	5	3	3	5
Clean Development Mechanism		3	5	3	3	5
Voluntary agreements		3	3/4	3	5	5
Early action before 2008		3	5	3	3	5

3 (ns)* : climate change issues are not addressed (see question 3) let alone policy mechanisms.

Remarks:

Bank of America does not address climate change related policy mechanisms.

Chase Manhattan does not address climate change related policy mechanisms.

Bank One does not communicate on climate change related policy mechanisms.

AIG does not communicate on climate change related policy mechanisms.

Prudential Insurance does not address climate change policy mechanisms.

Credit Suisse positively discusses emission trading as a possible new business opportunity.

It is involved in research and co-operations but mechanisms are not discussed.

Deutsche Bank is researching the potential and problems associated with trading emission rights. In advance of the ratification of the Kyoto protocol, Deutsche Bank starts the Prototype Carbon Fund. It is in favour of emissions trading and flexible mechanisms and early action. Deutsche Bank does not explicitly discuss the topic of national emission caps and/or voluntary agreements. However, they positively co-operate with all relevant stakeholders (e.g. ecological tax reform) and see ecological risks as economic risks.

HSBC does not address climate change related policy mechanisms.

Allianz does not actively discuss (future) mechanisms of climate change. Allianz is taking its responsibility and tries to stimulate others (national responsibility?) to do so and works together (voluntary) with the government in the Umweltpakt Bayern.

ING acts positively on the Kyoto protocol and the Dutch commitment (6% reduction). In this context ING participates in the MJA (reduction in the country itself/voluntary agreement) and has established the Clean Project Investment Initiative in co-operation with Energie Centrum Nederland, KPMG and ETC Energy (early actions/flexible mechanisms), and is willing to act in the future trade of CO₂ emission rights.

5) Are there recent changes in the following fields of cooperation?

Topic ↓	Name of company →	Bank of America	Chase Manhattan	Bank One	AIG	Prudential Am.
Industry association membership		No ⁺	No	No	No	No
Cooperative programs with governments		No ⁺	No	No ⁺	No	No
Cooperative programs with NGOs		No ⁺	No	No	No	No
Other		No ⁺	No	No	No	No

Topic ↓	Name of company →	Credit Suisse	Deutsche Bank	HSBC	Allianz	ING Group
Industry membership association		Yes	Yes	No ⁺	Yes	Yes
Cooperative programs with governments		Yes	Yes	No ⁺	Yes	Yes
Cooperative programs with NGOs		Yes	Yes	No ⁺	Yes	Yes
Other		Yes	Yes	No ⁺	Yes	Yes

Remarks:

Bank of America is very strongly communicating with other parties in order to keep informed. Environmental issues are taken up. In contrast, climate change is not (yet) directly addressed and emissions reduction activities are only indirectly developed.

Chase Manhattan does not report on environmental and/or climate change related changes in relationships/co-operations.

Bank One does not report on environmental and/or climate change related changes in relationships/co-operations. Minor investment and advisory activities (non-customer-oriented

by non-bank subsidiaries) are aimed at energy programs qualifying for tax credits under federal tax laws (working with governments within tax framework).

AIG is active in environmental insurance and has a certain expertise in risk measurement and risk management. Therefore, AIG is expected to co-operate in this field. However, AIG does not report on climate change related activities such as measures to reduce CO₂ emissions and is not expected to co-operate in this field.

Prudential Insurance does not report on environmental and/or climate change related changes in relationships/co-operations.

Credit Suisse co-operates with all relevant stakeholders (insurance branch, government, research etc.).

Deutsche Bank is co-operating with relevant stakeholders (e.g. government, EIB, World Bank, NGOs, science)

HSBC intends to take up on environmental issues (UNEP FI) and is involved in dialogue with all relevant audiences. In contrast, climate change is not (yet) publicly addressed.

Allianz is co-operating with several stakeholders to gain and spread knowledge on energy and energy reduction/substitution. Education (societal) is stimulated.

ING actively co-operates with all relevant stakeholders (e.g. governments, consultants, NGOs) in developing its strategy on climate change/CO₂.

Conclusion generic strategies

Bank of America intends (commitment) to look for good environmental performance that also makes good business sense. However, this can not yet be called a generic strategy, aiming to combat GHG emissions.

Chase Manhattan does not have a generic strategy to combat GHG emissions.

Bank One does not have a generic strategy to combat GHG emissions.

AIG does not have a generic strategy to combat GHG emissions.

Prudential Insurance does not have a generic strategy to combat GHG emissions.

Credit Suisse has developed a generic strategy to reduce GHG emissions.

Deutsche Bank has developed a generic strategy to reduce GHG emissions, which is limited largely to Deutsche Bank AG (Germany).

HSBC intends to take up environmental issues where practicable. However, HSBC has not yet developed a generic strategy to combat GHG emissions.

Allianz has developed a generic strategy to reduce GHG emissions, which is limited largely to Allianz SGD.

ING has developed a generic strategy to reduce GHG emissions, which is to be extended internationally (in line with CO₂ policy).

Conclusion sector specific strategies

Bank of America is not publicly active in developing strategies related to GHG emissions reduction. However, the issue of climate change is followed and indirectly addressed by certain environmental activities.

Chase Manhattan is not active in developing strategies related to GHG emissions reduction.

Bank One is not active in developing strategies related to GHG emissions reduction.

AIG is not developing sector specific strategies for GHG emissions reduction.

Prudential Insurance is not developing sector specific strategies for GHG emissions reduction.

Credit Suisse is developing a sector specific strategy for GHG emissions reduction.

Deutsche Bank is active in developing a sector specific strategy related to GHG emissions reduction.

HSBC is not publicly active in developing strategies related to GHG emissions reduction. However, environmental issues (e.g. CFCs) are to be incorporated in credit risk assessment.

Allianz is active in developing a sector specific strategy related to GHG emissions reduction.

ING is active in developing a sector specific strategy related to GHG emissions reduction.

Conclusion political/PR strategy

Bank of America explicitly reports that it does not have a climate change policy although the issue is followed.

Chase Manhattan is not reporting on climate change related issues / mechanisms / relationships.

Bank One is not reporting on specific climate change related issues / mechanisms / relationships.

AIG is not reporting on specific climate change related issues / mechanisms / relationships.

Prudential Insurance is not reporting on specific climate change related issues / mechanisms / relationships

Credit Suisse communicates and co-operates on climate change related issues but does not discuss potential mechanisms.

Deutsche Bank is reporting on climate change related issues, mechanisms and relevant relationships.

HSBC is not communicating on specific climate change related issues / mechanisms / relationships. However, the issue of CFCs and energy efficiency is indicated.

Allianz is reporting and co-operating on climate change related issues but is not (yet) discussing different mechanisms. It is possible that Allianz does not strive for a prominent role in a future emission trading system.

ING has developed a climate change strategy (important issues are clear) and is looking for ways of implementation (relationships/mechanisms) .

Conclusion overall

Bank of America is just starting to take up environmental issues as good business practise and is communicating a lot with other stakeholders. However, Bank of America explicitly reports that it does not have a sustainability policy or a climate change policy. It is possible that this awaiting attitude is related to the large clientele in the oil & gas, and automobile industry.

The environment is not an issue for Chase Manhattan let alone climate change. There is an absence of (communicated) environmental awareness, which may be indicated as an ignorant attitude towards the environment/climate change issues.

The environment is not a strategic (bank) issue for Bank One. The same holds for the topic of climate change. This may be an indication for an ignorant attitude towards climate change related issues.

AIG is a leading provider of environmental insurance programs. AIG states that “a predominant social responsibility of companies today is the environment. It is imperative for companies to examine their potential environmental exposure and to provide an effective

and efficient way to manage these exposures.” However, AIG is not active in developing specific climate change related strategies. AIG is confronted with preliminary negative financial consequences of environmental catastrophes but is not relating it to climate change (ignorance) and possibilities of future catastrophes.

Prudential Insurance is not actively involved in environmental and climate change issues. Prudential does report on the potential negative financial consequences of environmental claims (and divestment of these claims by selling Gibraltar) by unfavourable trends in legislature. However, Prudential seems to display an ignorant attitude towards environmental issues in general and climate change related issues in particular.

Credit Suisse is willing to play a (future) facilitating and stimulating role in CO₂ policy; developing an internal and external strategy.

Deutsche Bank is expected to play a (future) facilitating and stimulating role in CO₂ policy. It is developing internal and external strategies and has found preliminary ways for implementation.

HSBC is just starting to take up on environmental issues as good business practise. Climate Change and climate change related strategies are not specifically addressed. The preliminary activities reflect an awaiting attitude.

Allianz is developing CO₂ related internal and external strategies. It seems that Allianz does not strive for a prominent role in emission trading.

ING wants to play a facilitating and stimulating role in CO₂ policy and is actively developing an internal and external strategy and looks for ways of implementation.

APPENDIX 6. PROJECT DESCRIPTION

Abstract

There is a growing awareness that private companies play a critical role in success of efforts to address climate change, due to both their role as major emitters of greenhouse gases and to their capacity to invest in mitigation technologies. However, relatively little is known about the triggers for change in corporate behaviour, which are at the basis of corporate decisions to support or oppose policy initiatives.

Until now, much attention has been paid to interest groups in their initiatives to avoid change. Such attention provides a biased view on industry's perspectives, as it prevents fundamental discussion and hides divergent stances of individual companies. There is growing evidence of divergence in business strategies towards climate change. The question arises whether growing divergence can bring about a break-through in the implementation of the Kyoto Protocol.

The research project 'Diverging business strategies towards climate change' will investigate why and how companies in specific sectors of industry develop strategies to limit greenhouse gas emissions, with the aim to provide information of relevance to the COP 2000 Conference, November 2000 in The Hague.

The project focuses on strategies towards climate change in four sectors of industry, viz. the oil industry, the automobile industry, bank & insurance sector and chemical industry. Together, these sectors are the most important industrial players in the climate policy debate. Special attention will be paid to the questions whether strategies of EU based corporations differ systematically from USA based corporations and whether European and US trends are homogeneous or not (*i.e.* do all European/American companies follow a similar line or not).

In addition to four sector studies, parallel research seeks for general business trends vis-a-vis controversial climate issues in USA and Europe. This part of the project covers additional sectors of industry. Questions concentrate on much debated elements of the Kyoto instruments mix like Emission Trading, Joint Implementation and Clean Development Mechanism.

Introduction

The next Conference of the Parties (COP) of the Framework Convention on Climate Change (FCCC) will be held in The Hague, The Netherlands, in November 2000. The major focus of COP 2000 is on the Kyoto Protocol and its instruments.

There is a growing awareness that private companies play a critical role in success of the efforts to address climate change, due to both their role as major emitters of greenhouse gasses and to their capacity to invest in mitigation technologies.

Thus, securing the co-operation of companies is a key policy objective. At the same time, relatively little is known about the triggers for changes in corporate behaviour, which are at the basis of corporate decisions to support or oppose policy initiatives.

Until now, much attention has been paid to the representations of interest groups, especially to their initiatives to avoid change. Such attention provides a biased view on industry's perspectives, as it prevents fundamental discussion and hides divergent stances of individual companies (Kolk, 1999).

There is growing evidence of divergence in business strategies towards climate change (Levy, 1999). In the CFC discussions, preceding the Montreal Protocol, growing divergence between companies was essential for the political break-through of the Montreal Protocol (Landis Gabel, 1995; Levy, 1997). Can a similar scheme apply to the unfolding climate discussion? This research project wants to generate information for a successful climate policy, by exploring strategies of a series of international corporations within a framework of developments in leading sectors of industry. In particular, the project wants to investigate whether strategies of EU based corporations systematically differ from USA based corporations.

Objectives

The overall research objective is to examine **why and how companies in specific sectors of industry develop strategies to limit greenhouse gas emissions, with the aim to provide information of relevance for the COP 2000 Conference.**

Elaboration of the research framework

Research will concentrate on four sectors of industry and use a standard format for each sector. In addition, we will sketch developments in USA and Europe business policies towards controversial issues in the proposed instrument mix.

We propose to focus on **strategies towards climate change in four sectors of industry** that are clearly different in both their contribution to climate change and in their overall position in society, *viz.*

1. the oil industry: a process industry with large direct and indirect contributions to climate change; a sector dominated by a few large corporations;
2. the automobile industry: a product industry with limited direct contribution to climate change, but a large indirect contribution via the transport sector; a sector dominated by large corporations;
3. bank & insurance sector: service industry, with a small direct contribution to climate change, but whose indirect influence is potentially large; diversified sector, with both large and smaller companies.
4. The chemical industry: a process industry with large direct and indirect contributions to climate change; a sector dominated by large companies. The chemical industry is too heterogeneous to cover in a limited project. Therefore, we will concentrate on a few sub-sectors of utmost importance for the climate debate. HFC producers such as Du Pont will be a core topic.

We propose oil, chemical, automobile and financial sectors, because we believe they are the most important industrial players in the climate policy debate. Moreover, the three research participants have conducted research in these sectors before (see Biographies of Principal researchers). *A priori* sector knowledge fosters effective and efficient research. Sector attribution to project participants is as follows:

- WIMM-UvA explores developments in the oil industry;
 - U-Mass - Boston explores developments in the automobile industry;
 - IVM-VU explores developments in the bank & insurance sector;
 - IVM-VU and WIMM-UvA explore developments in sub-sectors of the chemical industry.
- The three partners will use a unified framework for research, which will allow comparisons to be made between sectors of industry. During the first stage of research, the research framework will be elaborated in detail. Basic elements include:

- a search for dominant trends in both USA and Europe, in order to make a comparisons between the two trade blocks;
- an investigation whether US and European trends are homogeneous or not (*i.e.* do all American/European companies follow a similar line, are there important outliers and how/what are the relations between EU and USA based corporations and their subsidiaries in the USA and Europe respectively);
- while focusing on business strategies, search for additional evidence about implementation (*e.g.* investment decisions, business restructuring);
- in explaining diverging strategies, determinants will be sought in both external circumstances (institutional pressures associated with particular national cultural and regulatory contexts) and business capabilities (company specific economic factors; company specific technological capabilities; organisational history; information about personnel attitudes);
- if business strategies have changed over time, what drivers brought about such a turnaround.

Research methodology consists of four case studies running parallel. Case study methodology is most appropriate to this research because of complex relations among the actors and variables. All participants used this method successfully in previous research.

In a parallel to the case studies, we seek for **general business trends vis-à-vis controversial climate issues** in USA and Europe. We will concentrate on much debated elements of the proposed instrument mix, and follow the same format as the sector studies. E.g. do dominant trends differ between USA and Europe and how homogeneous are USA and European trends. Elaborating on knowledge of research participants WIMM-UvA, U-Mass Boston and IVM-VU, the Pew Center on Global Climate Change, Arlington, USA, will add information from their network. Next to oil, chemical, automobile and financial sectors, we plan to screen three other sectors of industry. Sector choice will be made at the start of the project. Core questions and core sectors/organisations will be elaborated in co-operation with VROM and research partners.

Due to time constraints, sources of information will primarily be secondary data sources like company publications, trade journals and climate-related publications. Based on their existing networks, each research team aims to conduct a few semi-structured interviews in both USA and Europe. Our target group for interviews are environmental managers at corporate level.

Timeline and task division

Research would be conducted over a period of 7 months, starting April 1 2000. The research plan envisages three stages:

1. April 15 - May 15 Development of a unified research framework; choice o sectors of industry;
2. May 15 - August 1 Four parallel case studies + study on business trends;
3. August 1 - November 1 Findings and conclusions in the standard NOP-format, plus in a format regarded useful for the COP 2000 organisers and participants

In stages 1 and 3, IVM-VU will develop draft texts that will be commented upon by WIMM-UvA, U-Mass Boston and Pew Center. An Advisory Committee will be asked for suggestions and comments, including a final decision on sub-sectors within the chemical industry to be investigated. In stage 2, the research groups work in parallel. Contacts, discussion of drafts and exchange of comments will principally be by e-mail. IVM-VU has overall project responsibility.

An advisory committee, consisting of Dr. L.A. Meyer (VROM), Drs. M.T.J. Kok (NOP-Klimaat) and two business representatives, will meet May and September 2000. The draft results will be discussed with the committee before the findings and conclusions are presented in the final report.

APPENDIX 7. LIST OF PROJECT PUBLICATIONS

Levy, D.L. and A. Kolk (2000). Corporate political strategies in the US and Europe: Heterogeneity and convergence in the oil industry's response to climate change. *Pre-conference workshop social issues in management division, academy of management meeting*, August 5.

Van der Woerd, K.F., K. de Wit, A. Kolk and D.L. Levy (2000). Diverging business strategies towards climate change. A USA-Europe comparison in four sectors of industry. *Conference 'Instruments for Climate Policy: Limited versus Unlimited Flexibility*, Gent, October 19-20.

Van der Woerd, K.F., K. de Wit, A. Kolk, D.L. Levy and P. Vellinga (2000). Business strategies and climate change. Four sectors of industry in USA and Europe compared. In: *Change, Special COP-6 issue*, November 2000.