Carbon Market Intelligence Report
Issue #3

Prepared for PCF*plus* Research by EcoSecurities Ltd.

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6 – Regulatory Drivers of the Carbon Market – Market Intelligence Issue #2
7 – Joint Implementation in the context of EU accession – the case of the Czech Republic

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Introduction: Review of Critical Findings

The present document is the last of three Market Intelligence Reports prepared by EcoSecurities for PCF*plus* Research. It completes some discussions opened in Issues #1 and #2 (for example, discussion of renewable energy markets), and introduces new topics, most notably a summary of major corporate GHG emission reduction commitments.

This report is structured around the following sections:

- International news on Kyoto ratification;
- Public Policy: development of carbon markets and related regulations;
- Private Sector: Carbon Transaction Activities;
- Voluntary corporate commitments: major trends and emissions reduction goals;
- National Renewable Energy Policies following the Marrakech agreement; and
- Private Sector Initiatives in renewable energy development.

An analysis of selected voluntary corporate actions across a number of jurisdictions is available in Appendixes; (Appendix I), a description of GHG emissions positions with regard to Kyoto targets for Portugal, Greece, Spain, Poland, Hungary, the Czech Republic, the Slovak Republic, Russia, Ukraine and Bulgaria (Appendix II), the analysis of national energy policies, in particular with regard to renewables, for Australia, New-Zealand and Japan (Appendix III), and the review of European Energy Structure/Policies (Appendix IV).

Status of ratification of Kyoto Protocol and National Climate Change Policies

This section provides the reader with updates on national climate change policies between the second report (October, 2001), and January 2002.

Kyoto ratification progress

We note the readiness of the Norwegians to proceed with ratification by the end of Spring 2002 and highlight the Portuguese ratification progress, whereby Portugal became the first EU state to endorse the Kyoto agreement. These actions are joined by the formal expression of interest for the soonest ratification by South Africa and South Korea, while Japan and Russia reconfirmed their intention to strengthen cooperation on Kyoto's approval. We note that New Zealand has also pledged to proceed with Kyoto ratification by Fall 2002, but a number of internal political frictions within this country make us unsure about the feasibility of this commitment

National Climate Change Policies

The **Japanese** government appears to be backing down from its previous commitment to impose mandatory GHG emissions caps and have instead moved toward the promotion of voluntary corporate actions. At the same time, Japan continues to invest a great deal of effort to reduce GHG emissions in transportation, to promote national carbon sequestration opportunities and to establish a national corporate GHG reporting mechanism. Japanese authorities have also consistently tried to re-engage the United States in the international climate change regime.

Australia remains hesitant to endorse the Kyoto agreement in light of American withdrawal from the Treaty. Within the country however, it is important to note that the New South Wales (NSW) Government has imposed mandatory GHG emissions limits in the state's power industry.

New Zealand is making progress towards ratification, albeit at a slower pace than previously expected. The bulk of New Zealand's GHG policy has traditionally been based on carbon sequestration through agricultural and reforestation activities, but the government still has to finalize its policy position in this area before Summer 2002 if New Zealand is indeed to ratify the Treaty by Fall 2002. We have seen a number of reports illustrating strong opposition from New Zealand's industrial groups toward Kyoto ratification in light of Australian, American and even Japanese hesitation to proceed with the Treaty endorsement.

Since last report, new policies in **Canada**, including a $425 million into twenty-eight GHG emissions reduction projects pledged by Canadian environmental officials in January 2002, have been instituted.[1].

In the **European Union**, the **UK** continues to refine its internal emissions trading scheme; Italians are carrying on discussions of national carbon taxes applicable to *all* GHG emissions source; **French** Government has made some steps towards a voluntary emissions reduction commitments system for national energy-intensive industries; and **Sweden** has begun discussions towards increasing its national GHG emissions reduction commitment to 4 per cent below the 1990 levels (relative to the initial Swedish commitment of 2 per cent).

Private Transactions, Carbon Markets

Since last report, new GHG transactions have unfolded. Overall, EcoSecurities has identified transactions amounting to 220,000 tCO2e in various forms of private contracts between Shell-Canada, Air Liquide (Canada), Elsam (Denmark), E.ON (Germany) and Entergy (US). We also read about a new set of GHG reduction RFPs and private-to-public sector deals, headed by BC-Hydro's RFP for 5.5 MTCO2e, as well as agreement for the transfer of the first carbon credits to Norwegian Statoil for its investment in PCF-financed emissions reduction projects.

Voluntary Corporate Commitments

Together with Appendix I, Section III elucidates voluntary corporate commitments and represents the largest part of our Third report. Although it is impossible to provide a completely comprehensive overview of all private-sector emissions reduction initiatives (due to both the high heterogeneity of such commitments and their dynamic state[2]), EcoSecurities estimates the current

[1] For details see: http://www.earthvision.net/ColdFusion/News_Page1.cfm?NewsID=19084

[2] In reviewing voluntary corporate commitments, *EcoSecurities* encountered a serious problem with the corporate response rate. On average, across ten jurisdictions where we attempted to gather first-hand information, our response rate did not exceed 4 per cent. In the United States our response rate was close to 15-20 per cent, while in Australia – the jurisdiction of the highest return of our questionnaires – it approached 25%. EcoSecurities did not attempt corporate interviews in Spain, Greece, Portugal and Italy because we lacked *a priori* information about large-scale corporate commitments in those nations, with the exception of several initiatives by the Italian Enel, which themselves needed further research.

private-sector[3] global demand for carbon credits to be close to 187 MTCO2e for 2005[4] and over 200 MTCO2e by the beginning of the first Kyoto Commitment period in 2008.

The main body of this report is a detailed review of individual corporate commitments (Table I), and highlights the well-known achievements of Shell, Dupont, Alcoa and Fortum, to which we add a number of initiatives launched by German industries (including individual commitments by E.ON and BASF), selected Nordic trade associations (such as the Norwegian Aluminum Industry Agreement, where Elkem is a member) and the Australian Greenhouse Gas Challenge.

We emphasize the importance of voluntary corporate commitments for encouraging the return of the United States to climate change negotiations as a larger number of private leaders in GHG emissions reductions come from the United States (see our reports on IBM, Entergy, DTE Energy, Cinergy, Intel, Motorola, Kodak, UTC, Dow Chemicals and Johnson & Johnson, to name just a few[5]). We also highlight the importance of such US voluntary corporate initiatives as the *Chicago Climate Exchange* (CXX) and the Pew Center's *Business Environmental Leadership Council*, among others.

In sum, we hope that our review of voluntary corporate commitments demonstrates the diversity and richness of voluntary approaches to mitigate the threat of global warming. In light of these developments it becomes obvious that we are witnessing the birth of the global emissions trading market.

Renewable Energy Policies

In the final two sections, we review key post-Marrakech initiatives toward expanding the renewable energy capacities of Annex I States. In particular, we provide an overview of renewable energy policies in Australia, Japan and New Zealand (Appendix II, and Section IV (D)). We follow with Appendix (IV) providing a more in-depth analysis of European renewable energy developments.

We observe that the Australian Green Electricity Market has been successfully running since April 2001 with the launch of mandatory REC[6] trading. The Australian Renewable Energy Act (2000) aims at reducing GHG emissions by increasing the share of Australian electricity generated by renewable means from 10.5 per cent in 2000 to 12.5 per cent by 2010. This is expected to reduce Australia's GHG emissions by up to seven MTCO2e by 2010, requiring the infusion of an additional 9,500 GWh of renewable energy sources to Australia's electricity mix. In addition, Australia introduced an A$400-million *Renewable Remote Power Generation Program* in 2000, which provides financial support for the conversion of diesel-based generators to generators using renewable energy resources and technologies.

Renewable energy *markets* are slightly less developed in Japan, but Japan has nevertheless introduced a number of potent national renewable energy policies. For example, both Japan and

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[3] The reader should differentiate this commitment from the national demand for emissions credits associated with Kyoto emissions reduction requirements; the commitment mentioned in this sentence relates to the *voluntary corporate targets*.

[4] These numbers represent extremely rough estimates, as roughly 40% of the companies reported in our study chose not to disclose their quantified emissions reduction targets.

[5] Appendix I emphasizes that we chose to review the companies whose GHG emissions reduction commitments were *not* reviewed in any report published prior to January 2002. This automatically excludes BP, Shell and British Airways.

[6] Renewable Energy Certificates.

Australia are developing a set of initiatives supporting the use of biofuels to alleviate CO2 emissions from transportation. In addition, Japan is aggressively pushing for the expansion of national wind power generation capacity and planning the growth of power production from geothermal, PV and waste power energy sources. Through the national "Green Credit System" the Japanese government is further encouraging its planned three-fold increase in renewable energy production by 2010.

New Zealand's current renewable energy strategy (adopted September 2001) has two main targets: a 20 percent improvement in New Zealand's energy efficiency and an increase in renewable energy between 19 to 42 percent by 2012.

Meanwhile, Europe shows Netherlands liberalizing its 'green electricity' market; Germany increasing subsidies for solar, thermal, biogas and geothermal energy (while deciding to close its nuclear power plants); and the UK considering doubling its renewable energy target.

Renewables: Private Initiatives

EcoSecurities notes continuous growth of the wind energy sector, although the majority of activities appear to be shifting toward developing jurisdictions (such as Mexico) or concentrating in leading wind-power states (such as Spain). We also continue to observe gradual consolidation of corporate activities in renewables, which in the period under consideration was exemplified by Shell's acquisition of two German solar energy producers and Noun's announcement that it was investing in a large number of Spanish wind projects. In sum, we continue to observe a large number of activities in the wind energy sector, while simultaneously noting that large oil and gas companies are taking active positions in renewables (through asset acquisition), an observation emphasized in our first report that remains true.

Section I (A): International Negotiation/Ratification of the Kyoto Protocol: Post-Marrakech Developments

On the way to Kyoto Ratification

After four years of negotiations, the Kyoto Protocol has been rendered fit for ratification and entry into force, following the agreements on the rules for implementation at the latest round of talks in Marrakech. Since the conference held in Marrakech, and at time of completion of this report (February 2002), several countries have moved forward in the ratification process:

- The Portuguese council of Ministers ratified the Kyoto Protocol on December 19, 2001—six months ahead of the deadline fixed by the European Union (EU).[7] After ratifying the protocol, the Portuguese government announced that it did not expect to use emissions trading or other "External" (Kyoto flexibility) mechanisms to meet its obligations.[8]
- Japan and Russia reconfirmed they would continue cooperation towards implementing the Protocol and agreed to expedite preparations to carry out 13 joint research projects for environmental protection beginning 2002;[9]
- South Africa stated that it would ratify the Kyoto Protocol with the expectation that it will enter into force in 2002;[10]
- Germany has reaffirmed its commitment to cutting carbon dioxide emissions to 40% of 1990 levels by 2020, and has begun discussing the possibility of ratifying the Kyoto Protocol, with the expectation of ratification approval in 2002;[11]
- South Korea stated that it would ratify the Kyoto Protocol within the first 6 months of 2002. While South Korea is not currently included on the list of nations obliged to cut their GHG emissions, the nation expressed its desire to begin negotiation about joining the countries with mandatory emissions reduction caps in 2005; [12]
- Norway is expected to ratify the Kyoto Protocol in Spring 2002[13]; and
- In early February 2002 Members of the European Parliament voted by an overwhelming majority-- 540 to four with 10 abstentions-- to support European Union ratification of the Kyoto Protocol, as proposed by the European Commission at the end of 2001, when the EC announced its plans to ratify the Protocol by June 14, 2002. As of February 2002 EcoSecurities did not receive any confirmation that this timetable for Kyoto ratification by the European Union remains realistic.

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7 http://www.co2e.com; *Portugal Ratifies Kyoto Protocol*, Xinhua News Agency, December 19, 2001

8 http://www.enviornmentdaily.com

9 http://www.globalarchive.ft.com

10 http://www.co2e.com, *Pretoria to Ratify Kyoto Protocol*, Africa News Service, November 11, 2001

11 http://www.co2e.com, *Excellent atmosphere at Marrakech climate conference*, Deutsche Presse-Agentur, July 11, 2001

12 http://www.chosun.com; *Seoul to Ratify Kyoto Protocol Next Year*

13 http://www.co2e.com; *Norwegian Government: Bilateral Climate Change Agreement between Norway And Romania Signed 21 December, 2001: M2 Communications*, December 27, 2001

International Carbon Trading Initiatives: JI and CDM

We would like to draw the attention of our readers to three JI and CDM carbon transaction initiatives announced by Norway and the Netherlands shortly after the conclusion of the Marrakech meeting:

- In early January 2002, Norway and Romania signed a bilateral Climate Change Agreement on project co-operation to reduce GHG emissions. This is the first bilateral Joint Implementation project under the Kyoto Protocol that Norway has taken part in. It is estimated that the project will reduce about 500,000 tCO2e in its 15-year lifetime (starting 2002). The agreement implies that Norway will receive about 35,000 tCO2e annually, or a total of 170,000 tCo2e for the first Kyoto commitment period of 2008-2012;[14]

- On 5 December 2001, the Dutch Environment Ministry signed an agreement with Panama to buy credits from their clean energy projects in order to meet the Netherlands' CO2 emissions reductions targets.[15] The Dutch government has also signed the first international contract with the World Bank Group to start clean energy projects in developing countries. The three-year, $40 million contract with the World Bank Group's International Finance Corporation (IFC) will also provide the Netherlands with credits toward its carbon dioxide (CO2) reduction target laid out in the Kyoto treaty to cut greenhouse gas emissions.[16]

The continuing Dutch programs providing financing for JI and CDM projects are also worth mentioning as they are among the most significant initiatives to date. Following the ERUPT Joint Implementation (JI) tender in 2000, the Dutch government opened the doors of the new *Carboncredits.nl* program in November/December 2001. This new phase covers both JI and CDM projects. Bids are being welcomed for renewable energy and energy efficiency CDM proposals, with the tendering agency willing to accept *Expressions of Interest* until 31 January 2002. A new JI tender was due to open on 1 December 2001. The average price of carbon in the *pilot* ERUPT program was Euros 9/tCO2. Prices are *expected* to be within the range of Euros 5-6.

Carboncredits.nl is unrestricted in terms of geographical boundaries or entity of tender participants. Therefore, this program remains a unique demonstration of success in international project implementation efforts.

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[14] http://www.co2e.com; *Norwegian Government: Bilateral Climate Change Agreement between Norway And Romania Signed 21 December, 2001: M2 Communications*, December 27, 2001

[15] The Dutch government can purchase 20 tonnes under this agreement, http://www.planetark.com, ***Dutch sign CO2 cutting agreement with Panama,*** December 6, 2001

[16] http://www.planetark.org/dailynewsstory.cfm/newsid/14110/story.htm

Section II (B). Post-Marrakech Carbon Policy Developments: Country-Specific Initiatives

On the following pages we focus on carbon-specific internal policy developments within a variety of Annex I jurisdictions.

We begin our carbon policy review with a relatively in-depth review of Japanese carbon policies, since our two previous reports focused on those of North American and European Annex I states. Immediately following our review of Japan, we highlight key policy developments in Australia and New Zealand, which have been plentiful in the post-Marrakech environment.

We next proceed by detailing the policy developments in Canada and the United States
We conclude this section with a brief update on EU policy developments. The focus on Europe is going to be brief, since we have dedicated several discussions to on-going EU carbon policy in our previous reports (see section I in Report I and Section IV in Report II).

Public Policy

Japan

Due to a lack of US involvement combined with industrial lobbying against the fast-track ratification of Kyoto, Japan is moving more slowly in legislative GHG reduction efforts than originally anticipated. However, some decisions have been made in regards to how Japan will meet its Kyoto Protocol commitment.

First, the Japanese government has decided on emissions reduction targets for each ministry. The Ministry of Land, Infrastructure & Transport is required to cut 13 MTCO2e in the transportation sector; part of this reduction rests in plans to build special freight vessels that are expected to lower greenhouse gas emissions by 1 MTCO2e by 2010.[17]

In addition to developing these "Super Eco Ships", Japan is considering blending ethanol with gasoline to reduce automobile emissions (see the following section on energy policies for details).

At the same time, although initially expected to impose mandatory restrictions on greenhouse gas emissions, an Environment Ministry Policy Board has decided (under pressure from corporate lobbies) to drop mandatory GHG emissions restrictions and impose only voluntary limits on CO2 discharges from Japanese industries.[18] An advisory panel to the Minister of Economy, Trade and Industry (METI) proposed taking a staged approach toward a GHG emissions reduction target, and a subcommittee under the Industrial Structure Council has been examining ways to achieve such a target. An interim report calls for effectiveness reviews of emission-cutting measures and quantification of emissions levels every three years before 2008 to decide whether further action is necessary.

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[17] http://www.asahi.com----------------
[18] http://www.thescotsman.co.uk, Innes, John, *Japanese fight Kyoto agreement,* ***DATE***

Another measure under consideration by the Japanese government is a plan to require businesses to track and report their own emissions levels, which is essentially a proposal for a nation-wide voluntary GHG inventory. If voluntary action fails to produce results by 2005, the Environment Ministry will attempt tougher courses of action, such as setting *mandatory* reduction targets for individual businesses and requiring business to formulate strict emissions reduction plans.

These first-step inventorying measures are expected to come into force by the end of fiscal 2002. The Environment Ministry is also considering imposing taxes to discourage the use of fossil fuels.[19]

In addition to the voluntary reduction and tracking efforts of Japan, the government is intent on reducing nearly two-thirds of the GHG emissions through carbon sequestration. A committee commissioned by the Environment Ministry and Forestry Agency has determined that 3.9-percent of the 6-percent cut in emissions can be obtained through this measure.[20]

Australia

The new Australian Government has expressed doubt that it could "afford' Kyoto ratification after US withdrawal from the regime. Therefore, Australian GHG policies warrant close attention to assess the likelihood of its ratifying the Protocol and being a meaningful participant in the international GHG emissions reduction regime, as Australia is a pivotal player in the process of Kyoto ratification.

After the Marrakech meeting, a major breakthrough in Australian GHG policy came on 22 January 2002 when New South Wales (NSW, Australia's most populous and developed state) became the first jurisdiction within the Federation to launch discussions on establishing *compulsory* greenhouse emission standards for its power industry. The NSW Premier, Bob Carr, announced that he would launch a position paper that aims to end a failed voluntary scheme under which standards have gone backwards, replacing it with a compulsory one which would fine companies for non-compliance. The scheme, which could start as early as July 2002, would lead to increased electricity bills for consumers, though the state Government insists that the increase will be small.[21]

Mr. Carr said that the Government plans to reduce per capita greenhouse gas emissions to 5 per cent below 1989-90 (base year) levels, or 7.27 tCO2 per capita, by 2006-07. Each energy retailer in NSW, including the four government-owned businesses, would have to comply with these targets by 2006-7.

However, the above policy development remains an *exception* in the political landscape of Australian climate change legislation, where key politicians continue to speak out against mandatory emissions reduction targets. Immediately after the conclusion of the Marrakech negotiations, British Prime Minister Tony Blair encouraged the Australian government to take a firm stand in support of Kyoto ratification; however, the nation *largely* continues to maintain its position of being "on the fence".

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[19] http://www.asahi.com; The Asahi Shimbum; *Ministry to push business on gases;* November 17, 2001

[20] http://www.co2e.com; *Forests Eyed for Bulk of Japanese Greenhouse Cuts: World Entertainment News Network,* June 12, 2001.

[21] http://www.smh.com.au/news/0201/22/national/national11.html

New Zealand

Influenced by the Australian "no-action" stand on Kyoto and claiming that New Zealand's decision is not pivotal to the survival of the regime, New Zealand has been sending mixed signals about both its commitment to Kyoto ratification and its readiness/willingness to launch a steady GHG emissions reduction policy course.[22]

On the one hand, New Zealand pledged to make the decision on Kyoto ratification by August 2002[23], and the government has committed to ratify the Protocol by September 2002 (see the preceding section (Section I (A)) on International Developments). On the other hand, no specific or decisive policy actions have been undertaken in the carbon domain. The bulk of New Zealand's pre-2002 climate change actions concerned forestry-based carbon sequestration: the New Zealand Cabinet policy has been to distribute sequestration-related carbon credits to the owners of forests established since 1990, and not to use them as a national hedge to shield New Zealand emitters against international carbon prices.

Whether that policy needs modifying is one of the tough decisions to be made this year[24]. Others include whether agriculture (the source of nearly 50 per cent of New Zealand's GHG emissions) should be exempted, and what competitiveness-enhancing deals need to be made for carbon-and energy- intensive industries such as steel, aluminum and cement.[25]

In October-September 2001, New Zealand's Energy Minister Pete Hodgson held pre-Marrakech meetings with industries throughout the country to acquaint them with the challenges and opportunities of climate change regulations. However, as a result of these meetings, the industry responded by organizing a high-pressure opposition against the establishment of any quantified emissions reduction targets or other obligations that would bring the nation closer to meeting Kyoto obligations, should it decide to ratify the Treaty.

Currently New Zealand is reviewing a carbon tax proposal by a governmental Committee chaired by Rob McLeod. However, the Committee has promised to introduce no significant new taxes without a mandate from the next general election.[26]

United States

As the United States has not ratified the Kyoto Protocol under the Bush Administration, alternative climate change-related legislation has been introduced, with a scheme to tackle global

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[22] New Zealand is also understandably concerned with the Japanese ability to ratify the Protocol against the industrial opposition of Japanese industries and the continuing industrial slump: see http://www.co2e.com/News/story.asp?StoryID=287

[23] http://www.co2e.com/News/story.asp?StoryID=309

[24] The NZ *Institute of Economic Research* (NZIER) has estimated the implications of Kyoto options through its model of the New Zealand economy and found that initially there would be a loss of economic growth rate, followed by a recovery that would nevertheless put the country on a lower path of growth than it is assumed to follow now. See: http://www.co2e.com/News/story.asp?StoryID=217

[25] Meanwhile, on January 22 the New Zealand *Business Roundtable* voted against the government ratifying the Kyoto Protocol while the NZ Minister, Pete Hodgson, demonstrated more reasons why it should be done sooner rather than later. For details of this political discussion see: http://www.nbr.co.nz/home/column_article.asp?id=1450&cid=4&cname=Business+Today

[26] http://www.nzherald.co.nz/business/businessstorydisplay.cfm?storyID=2218 -- this tax review commenced in October 2001.

climate change targeted for the end of January 2002[27]. Legislation and proposals under consideration include:

- The trading of fuel economy credits, proposed in a report on fuel economy (CAFÉ) standards issued by a National Academy of Science panel—a market-based initiative to reduce petrol use by establishing a system of tradable credits for fuel economy improvements;
- An expanded program of pollution trading, which was proposed to include the swap of emissions permits for the release of nitrogen oxides, sulfur dioxide, mercury and the greenhouse gas carbon dioxide.[28]

In addition to government interest in emissions trading, both the US private sector and non-governmental organizations are pursuing the creation of a carbon emissions trading scheme in North America. Specifically, the US continues to consider a proposal under NAFTA that would cap emission levels, award permits and establish cross-border trading[29]. The complexities of this proposal include swapping emissions permits between countries with different regulatory systems.[30]

Beyond the Bush administration, NGOs and private industry, members of the House and Senate of the 106th and 107th Congresses have introduced climate change-related legislation, including bills designed to reduce greenhouse gas and other power plant emissions through market-based emissions credit trading schemes, tax incentives and carbon sequestration methods. These proposals are now at various stages of discussion in Congress-- none have been adopted to date.

Bills receiving the most attention are those that cap emissions from four pollutants and allow emissions trading. In 2001, Senator Jeffords, chairman of the Senate Environment and Public Works (EPW) committee, introduced S. 556, and Representative Waxman introduced H.R. 1256 - bills establishing caps to reduce emissions from four pollutants (nitrogen oxides, sulfur dioxide, mercury and carbon dioxide) and direct the US EPA[31] to establish a framework allowing flexible mechanisms (such as credit or allowance trading) to help achieve these reductions[32].

In October 2001, the Senate EPW Committee held an off-the-record “Stakeholders” Workshop where key players express their views and began work toward developing a compromise on emissions trading legislation. On 1 November 2001, the Senate EPW committee held a hearing on Senator Jeffords’ four-pollutant bill where participants supported the Bush Administration’s three-pollutant proposal — which *excludes* CO2. A second hearing on the Jeffords bill was held

[27] http://news.ft.com/ft/gx.cgi/ftc?pagename+View&c=Article&cid=FT3M72K3EVC&line =true&tagid+ZZZOMSJK30C&subheading=US

[28] According to John Graham, Office of Management and the Budget, “credits trading with a “cap” on the price of these credits would provide incentives for all manufacturers, including those that exceed the fuel economy targets, to continually increase fuel economy while allowing manufacturers flexibility to meet consumer preferences.

[29] http://news.tf.com/ft/gx.cgi/ftc?pagename=View&c=Article&cid=FT3LIEOV6VC

[30] Scott Vaughan, head of the trade and economics program at the CEC, says the US Environmental Protection Agency has shown “a lot of interest” in an emissions trading program. However, Anne Petsonk of Environmental Defense expects only a voluntary NAFTA-based program, under which companies would trade credits.

[31] Environmental Protection Agency.

[32] http://www.abanet.org/environ/committees/climatechange/newsletter/jan02/freimuth.html

on 15 November 2001. Senator Jeffords' bill could pass out of committee to the floor in 2002. EcoSecurities believes that due to disagreements among Midwestern Democrats and opposition by the Administration, a four-pollutant bill may take between five and seven years to find sufficient Congressional support.

Other climate change legislation introduced in 2001 includes a bill by Senators Byrd and Stevens: S.1008, the Climate Change Strategy and Technology Innovation Act of 2001. This proposal aims to develop a national climate change strategy to stabilize GHG concentrations, as well as to advance R&D in the clean energy technology program.

Senators Craig and Hagel introduced S.1293, the Climate Change Tax Amendment of 2001, to provide tax incentives for the voluntary reduction, avoidance and sequestration of GHG emissions, as well as the advancement of global climate science and the development and deployment of technology. Senator Murkowski and others introduced S. 1294, the Climate Change Risk Management Act of 2001, which establishes a national climate change strategy and greenhouse gas emission registry, as well as authorizing funding for the research, development and deployment of international clean energy and climate technology.

Finally, the Bush Administration announced on 21 January 2001 that it would soon reveal the national GHG plan *replacing* the abandoned pre-Bonn US position. On February 14 the new US policy was indeed announced, which called for the national "greenhouse gas intensity" target (to reduce GHG intensity by 18% relative to the 2002 levels or by 151 MMTCE per $1 million), expanded the existing programs encouraging companies to voluntarily report and reduce their greenhouse gas emissions and proposed increased federal funding for climate change science and technology development. The major difference between the Kyoto Protocol and the new US GHG reduction policy is that Kyoto established the *absolute* emissions reduction targets, while President Bush's plan focuses on *relative* emissions reductions.[33]

It is interesting to note that during the 1990s the US GHG intensity has already fallen by 16%. The Pew Center reports that the new US GHG emissions intensity reduction target appears to follow the natural trend, which the nation appeared to have followed without any specific emissions reduction policy.[34]

EcoSecurities does not have any position with respect to this statement. But it is important to stress that the new US GHG policy proposal has no linkages to the Kyoto protocol in terms of establishing any kind of "fungibility' of the Kyoto and US emissions reduction targets and/or emissions trading mechanisms. Put differently, there is no congruence between the US GHG emissions reduction proposal and Kyoto.

Canada

Both the government and private industry in Canada are moving forward with climate change initiatives. In January 2002, Canada's environmental officials unveiled a plan to slash national GHG emissions by more than 23.7 MTCO2e through the implementation of 28 specific projects. According to Ralph Goodale, Canada's Minister of Natural Resources, and David Anderson, Minister of the Environment, the total cost of the projects is set at $425.15 million, which are

[33] http://home.kyodo.co.jp/all/display.jsp?an=20020119107 (Kyodo News, January 21, 2002).
[34] http://www.pewclimate.org/policy/response_bushpolicyo.cfm+

being funded as part of the $1.1 billion in climate change commitments made in Budget 2000 and Canada's Action Plan 2000 on Climate Change [35].

Among these initiatives are:

- $30 million for the *Commercial/Institutional Buildings Retrofit Initiative*, which provides incentives, training, information and advice for energy-efficient retrofit projects on existing facilities;
- $35 million for the *Energy Efficient Housing Initiative*, which builds on the success of the *EnerGuide for Houses* by offering a national marketing effort and increased support in Northern and remote communities. The program also promotes the construction and purchase of energy efficient houses;
- $25.25 million for the *Clean Development Mechanism/Joint Implementation Office*, which will greatly expand activities to support Canadian companies' pursuit of greenhouse gas credits through project investments in other countries;
- $25 million for the *Carbon Dioxide Capture and Storage Initiative*, which will help demonstrate and commercialize technologies used in the capture, transportation and storage of CO_2 underground; and
- $19 million for the T*echnology Innovation Program*, which will accelerate the development of cost-effective greenhouse gas mitigation technologies and build the intellectual foundation for long-term technological advances.

We review major Canadian private section initiatives in Section III-C below.

European Union

Germany

German Greens proposed a stricter national emissions trading scheme to supplement other domestic actions.[36] Specifically, the existing German GHG reduction policy relies very heavily on sectoral voluntary actions (see Appendix I for details).

The Greens proposed a national emissions trading scheme under which the German Government would apply absolute emissions reduction targets to companies or sectors. The state would design the framework for trading, including monitoring, reporting, verification and sanctions. The Greens believe that all GHGs should be included in a trading system, but for practical reasons they suggested that on the initial stages that trading should be limited to CO_2. Emissions certificates would be allocated through a combination of a basic allowance based on "*grandfathering*" and an auction for additional requirements.

Participation in an emissions trading scheme should be compulsory to achieve liquidity and dynamics in the marketplace, and trading must start in 2005 to coincide with the EU-wide trading system. To induce a higher participation rate, the Greens propose that pre-2008 trading be voluntary.

[35] http://www.earthvision.net/ColdFusion/News_Page1.cfm?NewsID=19084

[36] http://www.globalwatchonline.com. See our previous report (of October 2001) on the details of German emissions trading system.

However, it is important to emphasize that the Greens' position includes continuation of eco-taxation and encouragement of additional voluntary corporate actions. The Greens also emphasize the need to examine whether CO2 emissions-related regulations could be *relaxed* for sites participating in an emissions trading scheme. Details of this proposal can be obtained from GIST.[37]

Italy

Italy is considering expanding the domains of its National Carbon Tax. Specifically, the plan involves applying the tax to CO2 emissions from *all* sources, instead of linking CO2 tax only to specific energy- or transportation-intensive sources. However, the Italian government announced that the year 2002 carbon tax rate would remain at its 2001 level; the rate freeze is intended to prevent energy prices from rising.[38]

France

In mid-January 2002, French ministers met with the leaders of 18 large energy-intensive and energy-producing firms to discuss the creation of voluntary agreements for "significant" cuts in CO2 emissions. French Industry minister Christian Pierret and environment minister Yves Cochet participated in this discussion and indicated that it was designed to measure companies' "willingness to engage constructively".[39]

Previously France had considered imposing an energy tax based somewhat on the carbon intensity of fossil fuels. However, this tax (developed by former Environment Minister Dominique Voynet) was ruled unconstitutional in January 2002.

Negotiation of voluntary emissions reduction targets is due to run until the end of February 2002. Voluntary agreements are hoped to be operational from 2002 to 2004 in the initial phase, after which they will be adapted to ensure compatibility with the EU emissions trading regime.[40]

Sweden

In November 2001, the Swedish government suggested legislation to increase its GHG Emissions Reduction Target. Sweden will now aim for a 4 % cut from 1990 GHG emissions levels by 2008-12, two percentage points beyond its previous commitment of minus 2%. Under the Kyoto Protocol, the country's legal commitment is to limit emissions only to 4% above its 1990 emissions levels. This move makes Sweden one of the few countries (following the UK and Germany) that have pledged to reduce emissions *beyond* their Kyoto requirements. Green tax adjustments are among the measures Sweden will use to reach its new targets. Sweden is also considering new surcharges for CO2 emissions in aviation.

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[37] A copy of the 3-page German language report is available from the GIST service. http://www.globalwatchonline.com
[38] ENDS Environment Daily, October 30, 2001.
[39] Information courtesy of André Marcu, *International Emissions Trading Association* (IETA); distributed on January 13, 2002.
[40] Agreements will be based on companies committing to measurable and verifiable emission cuts. Some type of "proportionate" sanction scheme has to be put in place to enforce the rules upon companies that fail to meet their GHG emission reduction targets. All remaining details have yet to be decided. The 18 companies singled out for voluntary agreements together account for more than two-thirds of France's total industry and energy-related CO2 emissions.

United Kingdom

The UK Government has postponed the launch of the first national emissions trading Auction until 1 February (from the original launch date of 1 January 2002). The UK government has given national businesses an extra month to register for the Auction and to calculate and verify their "baseline" GHG emissions levels, averages of levels from 1998 through 2000. So far 90 companies (including Anglia Water, British Airways, BP, Dupont, General Domestic Appliances, Rolls-Royce and Somerfield) have expressed interest in taking part in the Auction and subsequent trading, which is set to commence on 1 April 2002. Still, because the UK government encourages *maximum* participation in return for the £215m in incentives budgeted through 2005; more large- and medium-size businesses are expected to participate in the first Auction.[41]

Carbon Transactions/ Private-Sector Contracts

- Below are listed the main carbon transactions by private companies EcoSecurities is aware of since signature of the Marrakech accords. PanCanadian, a premier North American energy company, and Italy's Eni have become the latest addition to the International CO2 Capture Project. The CO2 Capture Project (CCP) is a consortium formed to research and develop technology aimed at reducing GHG emissions through various underground sequestration techniques. The $28 million consortium was established in May 2000 by BP, Chevron, Norsk Hydro, the Royal Dutch/Shell Group of Companies, Statoil, Suncor Energy and Texaco. Over the next three years, the CCP is focusing on researching and developing advanced CO2 capture and geological storage technologies.

- Elsam, Denmark's largest power firm, sold 100,000 tons of carbon credits to German E.ON and 10,000 tons to US Entergy. In addition, Italian Energi E2, a rival power company, has sold 50,000 tons of certificates to E.ON. Carbon prices in these transactions were not disclosed.[42]

- In addition to Canadian governmental initiatives, BC Hydro, Canada's third largest electric utility, issued in January 2002 an international RFP for 5.5 million tons of greenhouse gas offsets, and voluntarily committed to offsetting 50 per cent of the increase in greenhouse gas emissions through 2010 at two new natural gas-fired electricity generation plants. At present, BC Hydro is seeking proposals for quality greenhouse gas offset projects located world wide, including landfill gas, renewable energy, energy efficiency, fuel switching, industrial process improvements, agricultural waste management and others.[43] The aim of the company is to begin signing contracts by late 2002 or early 2003.[44]

- In 2002 Norwegian Statoil is set to receive its first emission credits from the Prototype Carbon Fund. Statoil's share of the fund is 3.45 per cent, and it will receive a corresponding return in emissions credits. In addition, Statoil plans to invest

[41] Financial Times, January 4, 2002.
[42] http://www.planetark.org, Birgitte Dyrekilke, ***Denmark seals its first CO2 pollution deals***, December 7, 2001
[43] The company is looking to acquire offsets occurring between 2002 and 2020. The minimum project size is 100,000 tons over the contract term.
[44] http://199.97.97.163/IMDS%PMANAT0%read%/home/content/users/imds/feeds/comtex/2002/01/10/cn/0000-4321-bc-hydro-gas-offsets

$5 million into the Fund over 11 years, relating to the first Kyoto period from 2008 to 2012.[45]

- In December 2001, the cities of Chicago and Mexico City announced their intentions to join the above-mentioned Chicago Climate Exchange (CCX). Grupo IMSA of Mexico, an aluminum products manufacturer, also announced its intent to participate in the design phase of the CCX, joining 40 other entities that have made a similar commitment.[46]

- Shell announced that it will sell some CO2 emissions to Air Liquide, a Canadian company that processes CO2 for sodas.[47] Shell will eventually be providing 62,000 tCO2 per year to Air Liquide, which will use the CO2 in oil well injection projects. In return, Air Liquide will now be Shell's sole supplier of steam and electricity from its cogeneration plant. As a result, Shell will no longer have to purchase electricity from the Alberta grid. The amount of CO2 to be sold accounts for 62% of the Shell plant's emissions, which otherwise would have been discharged into the atmosphere. Shell Group emits about 100 MTCO2/year worldwide, which the company claims to be a reduction of 22 MTCO2 since 1990.[48]

- On 1 November 2001 Japanese Tohoku Electric Power announced that it plans to sign coal-purchasing contracts, which come parceled with rights to emit CO2, from two Australian coal suppliers (*Powercoal Pry Ltd*. and *Centennial Coal Co*., both based in New South Wales). Under the expected contractual agreement, which will cover several years from April 2002, Australian companies will sell the Japanese firm emission credits earned through emission-reduction projects.[49] The trading volumes and negotiated prices were not disclosed.

[45] http://www.www.co2e.com, *Statoil to get emission credits from World Bank prototype carbon fund in 2002*,
[46] http://ens-news.com, *Carbon Trading Market Expands to Chicago, Mexico City*, November 13, 2001
[47] http://www.airliquide.ca
[48] Ibid.
49 http://www.eyeforenergy.com/Tohoku Electric to buy GHG Emission Rights From Aussie Coal Suppliers, November 1, 2001

Section III (C): Voluntary Corporate Initiatives

Appendix I to the present report describes a variety of corporate GHG emission reduction commitments. This information is useful to a wide range of readers because it provides some insights on potential demand for emission credits both *out of* the likely boundaries of the Kyoto regime (most voluntary commitments we have identified are in the US) and *before* the Kyoto regime takes place. In the following paragraphs, we summarize key findings of this review, and present the list of all corporate commitments EcoSecurities have come across during preparation of this work.

Key findings

1) The most ambitious emissions reduction commitments and the most elaborate and far-reaching emissions reduction plans are developed by the largest companies within the fossil fuel and electricity industries – e.g. BP or Fortum. This clearly translates the corporate objective to reduce the risk of exposure to any forthcoming GHG liabilities.

2) Geographically, the largest number of voluntary emissions reduction activities originates in the United States. In our opinion, large US-based businesses appear to recognize the *commercial benefit* of early actions in GHG markets, which would permit them to become carbon sellers at a later date, thus providing such companies with an additional source of revenue. We came to this conclusion because a number of large US utilities have volunteered CO2 emissions reduction targets, which would be difficult to explain solely by the fear of future carbon liabilities *outside* of the United States.[50] Anticipation of further action within the US also play a role;

3) A large number of voluntary GHG emissions reduction Agreements between government and industry exist in Germany, the Netherlands, Nordic States and other West European nations. However, such voluntary agreements are qualitatively different from the above-mentioned US-based initiatives, in that they usually represent *sectoral* agreements negotiated with central governments in exchange for the governments either reducing carbon taxes or pledging not to impose *tougher* command-and-control regulations. We classify such agreements in a different cluster of voluntary actions, as they do not represent unsolicited individual corporate initiatives.

   Such 'institutionalized' voluntary commitments should be reviewed both on the level of respective industrial sectors/Unions and on the level of the largest emissions-bound multinationals within each sector. We provide several brief illustrations of such sectoral Agreements in Appendix I with the examples of Germany, Norway and, to a limited extent, the British MACC2 program. It was beyond the scope of this study to review all burgeoning sectoral agreements.

4) It would be a mistake to think that the US, Canadian or Australian[51]–based voluntary GHG initiatives do not enjoy *any* governmental support or assistance from national 'civic

[50] In addition, the US has the tradition of voluntary actions 'testing the ground' before establishing any command-and-control policies in multiple environmental areas, and this tradition seems to continue with regards to GHG issues.
[51] We refer here to Canada and Australia because Canada closely follows the US in the number of independently initiated emissions reduction commitments and Australia continues to emphasize its intent to rely on voluntary commitments until the US does not return back to the Kyoto ratification table. The reader will be able to better appreciate our logic for this classification after reading Appendix I.

societies'. In Canada and especially Australia, voluntary corporate GHG commitments are actively promoted and reviewed by public entities, such as the Australian *Greenhouse Gas Challenge* program, although sectorally negotiated agreements are a rarity. In the US, lacking post-Clinton federal support, the place of governmental regulators was taken by 'specialty non-profits' and/or information 'clearing houses' such as the well-known *Environmental Defense* and *Pew Center*, while the US EPA continues to carry out minimal coordination of the few GHG reduction activities remaining from the Clinton Administration (for example, see information on the Semiconductor GHG reduction initiative in Appendix I).

5) Voluntary corporate actions significantly benefit from the activity of such expert support as the *International Business Council for Sustainable Development* and *Pew Center*. We expect that such expert groups will continue to play an important advisory role.

6) We further expect that until the beginning of the first Kyoto commitment period (2008-2012), the negotiated sectoral Agreements will remain the most *politically* acceptable way for national governments to induce cooperation of national businesses in GHG emissions reduction programs. It is also likely that they will remain the most acceptable instruments to national business interests as well.

   The difficulty is to ensure that such voluntary Agreements converge over time towards the most successful types of actions, identified by 'trial-and-error' across all countries. Such convergence would facilitate the launch of similar across-the-board obligatory GHG emissions reduction policies in multiple jurisdictions and facilitate the launch of broad-scale international emissions trading in the first Kyoto commitment period.

7) Finally, we observed that voluntary commitments are highly heterogeneous in their nature[52], which makes it difficult to compare their respective effectiveness in reducing GHG emissions, or to assess their economic attractiveness. As a result, EcoSecurities does not embark on such comparisons.

Cumulative Review of Emissions Reduction Commitments

In this analysis, EcoSecurities has focused on the corporate commitments meeting the following criteria:

a) Companies that are not frequently reviewed in published reports on voluntary emissions reduction commitments (e.g. which automatically excludes Royal Dutch Shell and/or British Petroleum from the following analysis);

b) Entities with substantial volumes of GHG emissions relative to the approximated sectoral average (in high thousands of tCO2e or low MTCO2e, depending on the nature of business under consideration); and

c) Businesses, which were recommended to us in confidential interviews with national GHG authorities.

Appendix I to this report presents the detail of the commitments we are aware of and which meet the above requirements. Table I below is actually larger, as it encompasses *all* the commitments EcoSecurities has come across during the preparation of this study.

[52] See Appendix I for details.

Table 1: **Voluntary Corporate Emissions Reduction Commitments: 1995-2010, Annex I**

Sector	Name	Website	Country	Emissions (1999 or 2000, MT)	Commitment	Quantity	Internal trading?	Outside projects?	Notes
Airline Management	BAA	http://baa.co.uk	UK	Not released	Reduction of absolute emissions from airport management operations by 5% by March 2010 relative to 1990 base.	Approximately 110,000 tCO2e	Not considered	No	Member of the British MACC2 program ("Making a Corporate Commitment")
Aerospace (Fuel Cells)	United Technologies (UTC)	http://www.utcfuelcells.com/index_fl.shtml	US	1.9	25% reduction of energy consumption from 1997 to 2007 as a percentage of sales and reduce GHG emissions by 13% from 1997 to 2000	Not known	No	No	N/A
Aluminum	Alcoa	www.alcoa.com	US	38	A 25% reduction in greenhouse gas emissions by 2010 compared to 1990. Assuming success with the inert anode technology, a 50% reduction by 2010.	Not known	No	"One Million Trees" Program: to plant 1 million trees by 2008	N/A
Aluminum	Elkem	www.elkem.com listed on an industry website but didn't work when tried	Norway	Not known	For every ton of aluminum produced, emissions will be reduced by 55% in 2005 compared to 1990 level.	Not known	Not known	Tentative support for JI and CDM	The Norwegian Aluminum industry has agreed to voluntary targets with the government. For every ton of aluminum produced emissions will be reduced by 55 percent in 2005 compared to 1990 levels.

Sector	Name	Website	Country	Emissions (1999 or 2000, MT)	Commitment	Quantity	Internal trading?	Outside projects?	Notes
Aluminum	Pechiney	http://www.pechiney.com/pechiney/webpechiney.nsf/Internet/PresseV5_VINT?OpenDocument&QueryExpand=1$&QueryVue=ComPAllV5VINT$&QueryCount=5$&LANG=VINT$	France	528 MtCO2/for France	Not Found	Not known	Not known	No information	Most emissions come from electricity demand instead of production processes. The company's options to reduce CO2 emissions are hard to estimate due to a great deal of electricity coming from nuclear--Electricite de France. The company is a member of the Partnership for Climate Action
Aluminum	Voluntary Aluminum Industrial Partnership (VAIP)	http://es.epa.gov/partners/vaip/vaip.html	USA	Not released	Aluminum: Several companies have committed jointly to reduce PFC emissions 40% from 1990 by year 2000 (~2.2 million metric tons of carbon).	Not known	Not known	No	For information contact the USEPA
Automotive manufacturing	Ford Motoring Company	http://www.ford.com/en/ourCompany/environmentalInitiatives/default.htm	USA	Not released	*Improve fuel efficiency of SUVs by 25% of 2001 levels by 2005 *Reduce GHG emissions from European fleet by 25% of 2001 levels by 2005	Not known	No	No	
Automobile Industry	Toyota	http://www.toyota.com/html/about/environment/index.html	Japan	In 2000 Toyota reduced their emissions by 3,300 tons/year (goal for 2000 was 2,700 tons/year)	Toyota has set a goal of stabilizing CO2 emissions at 1990 levels by 2005.	Not known	No	Interest in JI/CDM	
Beauty and other well being products	The Boots Company	http://www.boots-plc.com/environment/information	UK	Approximately 272,000 tCO2/year in 2000	A 10% emissions reduction by 2005 from the 2001 base	Approximately 27,200 tCO2e by 2005	No	Member of the British MACC2 program ("Making a Corporate Commitment")	
Automobiles and parts	Toyota Motor Manufacturing North America	http://www.toyota.com/html/about/environment/news_awards/enviroreport.html	USA	Not released	Reduce energy use per unit of production by 15% from 2000 levels by 2005	Not known	No	No	
Carpeting and Flooring	Interface, Inc.	http://www.interfaceinc.com/	USA	Not released	Reduce non-renewable energy use per unit of production by 15% from 1996 levels by 2005. Increase renewable energy use to 10% of total energy use by 2005	Not known	No	No	

Sector	Name	Website	Country	Emissions (1999 or 2000, MT)	Commitment	Quantity	Internal trading?	Outside projects?	Notes
Cement	Lafarge	www.lafarge.com	France	70 MTCO2e for 2000	20% reduction for the period 1990-2000; which corresponds to 15% reduction by 2010 RE: absolute levels of emissions	Approximately 4.5 MTCO2e by 2010	No	Not known	Most emissions reductions will be achieved through energy efficiency measures and, in the future, -- switch to renewable energy with the assistance from the WWF.
Chemicals	BASF	http://www.basf.de/en/corporate/environment/sb00/	Germany	8.4	Reduce CO_2 emissions from a German plant from 4.7 million tons to 3.6 million tons by 2000	3.6-4.7 MTCO2e	No	Considering JI/CDM, but restricted by sectoral interests	
Chemicals	Dow Chemicals	http://www.dow.com/environment/ehs.html	US	Not released	Reduce energy use per pound of production by 20% by 2005	Not known	No	No	
Chemical	Dupont	http://www.dupont.com/corp/environment/	US	87 MTCO2e in 1990, 49 MTCO2e in 1999	-65% emissions reductions (ER) in 2010 compared to 1990 (-45% in ER by operations realized in 2001) Hold total energy use flat at 1990 levels. Source 10% of global energy use from renewable sources by 2010.	If 1999 is the baseline for the last commitment, we obtain 13 MTCO2e by 2010	No	Not known	See emissions in Annex I - CO2 emissions have risen by 7% over 1990-1999, but N20 emissions have been cut by 90% Partnership for Climate Action Member; Member of Chicago Climate Exchange
Chemical	VCI (German Chemical Industry Association)	http://www.cefic.be/activities/hse/rc/rc1997/01.htm	Germany	Not released	45%-50% emissions reduction by 2012 relative to 1990 emissions levels	Not released	Still not decided	Still not decided	This is a sectoral Agreement
Chemicals	Rohm and Haas	http://www.rohmhaas.com/company/environment.html	Germany	6.9	Reduce energy consumption by 5 % per pound of product from mid-1999 levels by year-end 2001. Further firm 5-year reduction goals to be established at year-end 2001, targeted at a total reduction of 15 % per pound of output by 2006.	N/A (the emissions reduction target is structured as an energy consumption goal)	Not decided	Not decided	

Sector	Name	Website	Country	Emissions (1999 or 2000, MT)	Commitment	Quantity	Internal trading?	Outside projects?	Notes
Coal	UK Coal Plc.	http://www.ukcoal.com	UK	No released	For 2001-2005 the emissions reduction target is to increase utilization of coalmine methane (CH4) by 135% relative to the 1998 base year	320,000 tCO2e/year; in 2005 the total volume of emissions reduced should reach 1.6 MTCO2e	No	Not considered at this moment	Member of the British MACC2 program ("Making a Corporate Commitment")
Computer Industry	IBM	http://www.ibm.com/ibm/environment/annual2000/IBMEnv2000.pdf	US	From 1990 through 2000, estimated reduction of 5.6 MTCO2E in emissions from reduction of 8.9 billion KW/h in electricity consumption; for 2000 total volume of emissions was at 3.4 MTCO2e	*Improve energy efficiency by 4% annually. *Reduce CO2 emissions by 4% annually through 2004 with 1998 as the base year. *Reduce per unit of production PFC emissions from semiconductor manufacturing by 40% from 1995 levels by 2002. *Have 90-100% of new models Energy Star compliant each year. *Reduce PFC emissions by 10% below 1995 levels by 2010	With 1998 as a base year, the emissions reduction goal would come to 0.164 MtCO2e per year, and 0.82 MtCo2 by 2004.	Not known	Not known since most existing measures rely heavily on energy efficiency	Member of Climate Savers (partnership with WWF and Center for Energy and Climate Solutions)
Electric Utility	ACTEW Corporation	http://actew.com.au/publications/environmental/pdf/emp.pdf	Australia	125,558 tCO2e for 1995 (the latest data available)	Emissions reduction target accomplished in 2001, no new target announced post -2001	4,835 tCO2e/year -- **accomplished by 2001**	No	No	Member of Australian "Greenhouse Gas Challenge" Program (Governmental Voluntary Emissions reductions initiative)
Electric Utility	BC Hydro	http://eww.bchydro.bc.ca/environment/	Canada	Not released	50% emissions offset from operation of two new gas-fired power plants	5.5 MTCO2e	Not known	Yes: Issued 2 RFPs for carbon offset projects: one-- Canada oriented in 2001 and an RFP for international carbon offsets in 2002	N/A
Electric Utility	Chubu Electric Power Co.	http://www.chuden.co.jp/english/corporation/fr_environment.html	Japan	51.3 MtCo2 in 1999 0.427 kg Co2/kwh	0.410 kgCo2/kWh in 2005	Approximately 2 MTCO2 by 2005	No	Unclear apart from PCF	N/A
Electric Utility	DTE Energy	http://www.dteenergy.com/community/environmental/greenhouseGases.html	US	Not released	Reduction by 5% relative to 1999 emissions levels by 2005	Not released	To be decided	To be decided	The company is a member of the CCX

Sector	Name	Website	Country	Emissions (1999 or 2000, MT)	Commitment	Quantity	Internal trading?	Outside projects?	Notes
Electric Utility	Cinergy	http://www.cinergy.com/about_cinergy_corp/community_involvement/environmental/default.asp	US	In 1990-2000 Cinergy achieved emissions reduction of approximately 12 MTCO2e.	Cinergy committed to plant 3.5 million trees over the next 10 years (until 2010). This will offset about 2.5 MTCO2e over 50 years.	Not released	To be decided	To be decided	Member of CCX
Electric Utility	CS Energy	http://csenergy.com.au	Australia	7.4 MTCO2e in 1995 and 7.9 MTCO2e in 1996 (the latest data available)	The 1995-2001 commitment has expired, under which CS Energy committed to reduce its GHG emissions by 6% (1995-2000)	The company is considering adopting a new commitment to the Australian GHG Challenge by 2003; until 2001 the commitment stood at 520,000 t/year	No	No	Member of Australian "Greenhouse Gas Challenge" Program (Governmental Voluntary Emissions reductions initiative)
Electric Utility	Entergy	http://www.entergy.com/environment/	US	Reduction of 28.1 MTCO2e since 1995 (under Entergy's Commitment to the USDOE's Climate Challenge Program); additional emissions reductions through the UtiliTree Carob Company (7.7 MTCO2 reduction through this program in 1999); in 2000 total GHG emissions reached 53.2 MTCO2e	Stable CO2 emissions from US generating facilities at 2000 levels through 2005.	Approximately 30 MTCO2e	Not known	Considers projects in the countries where it owns facilities, but no trading with the US facilities	Member of the Pew Center's Business Environmental Leadership Council (BELC)
Electricity	The Federation of Electric Power Companies of Japan	http://www.fepc.or.jp/english/index.html	Japan	Not known	Reduce CO_2 emissions from electricity generation by 20% of 1990 levels by 2010	Not known	Under consideration	Will consider CDM, especially in China	

Sector	**Name**	**Website**	**Country**	**Emissions (1999 or 2000, MT)**	**Commitment**	**Quantity**	**Internal trading?**	**Outside projects?**	**Notes**
Electric Utility	Fortum	http://www.fortum.com/document.asp?path=6213;6217;6248;6256;6857;6889;6893	Finland	About 12 MtCO2e in 1996 About 9 MtCO2e in 2000	Increased use of biofuels in heat & power production by 50 %, resulting in a reduction of Fortum's annual CO2 emission in Finland by up to 500,000 tCO2 by 2005	50,000 tCO2e	Yes, interest in both JI and CDM	**Sold** 50,000 TCo2 to EPCOR Set up a Fund with 1.6 M euros for 2000 which seeks to invest not only in PCF, but also in independent deals	Participant to the Prototype Carbon Fund; created a GHG-emissions reduction "Climate Fund" with the initial capitalization of Euro 1.6 million (2000)
Electric Utility and Coal Mining	Loy Yang Propriety	http://www.loyyangpower.com.au/site/main	Australia	16.15 MTCO2e in 1995/96 (the latest year for which the data are available)	The 19956-2000 Australian Greenhouse Gas Challenge Commitment was reduction of GHG emissions by 4.26% by 2001; post-commitment is under consideration with a **tentative emissions reduction target of 2% by 2005**	0.68 MTCO2e by 2001, no post-2001 commitment	No	No	Member of Australian "Greenhouse Gas Challenge" Program (Governmental Voluntary Emissions reductions initiative)
Electric Utility	E.ON Energie AG	eon-energie.com	Germany	1998: 50 MTCO2e	E.ON Energie has taken over a voluntary agreement (within the framework of German electricity sector Agreement with eh German Government) to reduce its CO2 emissions by 30 %, which is equivalent to 45 MTCO2e (for the sector as a whole) until 2010. Within this agreement E.ON's specific CO2 reduction target is approximately 10%	Until 2010: 5 MTCO2e	Not known	Not known	N/a
Electric Utility	Ontario Power Generation	http://www.opg.com/environmental/apr.asp	Canada	1990: 26 MtCo2 (excluding other GHGs); emissions in the base year equaled to 32 MtCO2 (2000)	Commitment: Stabilize CO2 emissions at 1990 level by 2000. Approximately -6% by 2010	6MtCO2 in 2000	No	Yes - Both within Annex B and out of Annex B (mostly plantations)	Partnership for Climate Action Member
Electric Utility	Pacific Gas & Electric	www.pge.com	US	No year-specific commitment	In an average wind year, Madison Windpower will save 12,000 tCO2e, compared with the average emissions from other generating facilities in New York state.	12,000/year	No	No	N/A

Sector	Name	Website	Country	Emissions (1999 or 2000, MT)	Commitment	Quantity	Internal trading?	Outside projects?	Notes
Electric Utility	TransAlta	http://www.transalta.com/WEBSITE2001/TAWEBSITE.NSF/AllDoc/2C2957D414E3D474872569AB0079D2E3?OpenDocument RFP of GHG ER projects at http://www.transalta.com/WEBSITE2001/TAWEBSITE.NSF/AllDoc/A24A297B0579608D872569AD005922DB?OpenDocument	Canada	38.4 MtCO2e emissions in 2000	*Return GHG emissions to 1990 levels by 2000. *Achieve zero net GHG emissions from Canadian operations by 2024.	Claim to having realized 6.6 MtCO2e emissions reduction in 2000. Approximately the same reduction commitment for 2002	Not known	Yes. Purchased 1.774 MtCo2 in 2000 Project to increase cattle digestive health, thereby reducing methane emissions: 28 MtCO2E over next 32 years, among which 3.3 MtCO2E between 2008 and 2012 Plan to invest up to 2MtC02 in 2001	For the same period (2000), the company claims to have reduced emissions domestically (purchase of green power and other action), by 4.8 MtCo2.... Which would mean that trading is about 30% of total emission reductions. Member of VCR.
Electronics	ST Electronics	http://www.stelectronics.com/index.html	Switzerland	Not known	Their goal is to become carbon dioxide neutral by 2010. Plans include: to reduce total energy consumption by 5%/year for each million USD of added value; create carbon sinks through reforestation; energy efficiency and renewable energy measures.	Reduction of 11 MTCO2e by 2010 (reductions started in 1994)	Not known	Interested in sequestration-related carbon offset projects; initial plantation initiatives started in the US ($2.5 million forestation effort in Texas)	Member of the World Semiconductor Council (WSC), which adopted industry-specific emissions reduction target of 10% below 1995 levels by 2010. 24 semiconductor companies signed MoA to share technical information on GHG reduction.
Engineering, design, and manufacturing	SIEMENS	http://www.siemens.com/	Germany	Not known	Reduce energy use in German facilities by 10% of 2000 levels by 2001	Not known	Not known	Not known	N/A
Finance	Abbey National	www.abbeynational.com	UK	65,000 tCO2e in 2000	Reduction of 10% relative to 1999 by 2004	6,500tCO2e	No	Not known	CO2 is the only gas on which the company has the commitment; the target takes no account of emissions from business traveling
Food processing	J Sainbury	http://www.j-sainsbury.co.uk/csr/environment.htm	UK	Not known	Increase the use of renewable energy to 10% by 2010 compared to 2000 levels	Not known	No	No	N/A

Sector	Name	Website	Country	Emissions (1999 or 2000, MT)	Commitment	Quantity	Internal trading?	Outside projects?	Notes
Footware	Nike	http://nikebiz.com	US	Not released	Emissions reduction by 13 per cent below 1998 levels by 2005; design GHG reduction strategies for sub-contractor facilities by 2005	Not released	No	No	Nike is interested in financing GHG reduction projects in developing countries, but currently it is planning to carry out such reductions only on its own production facilities
Fertilizers, industrial chemicals manufacturing, other	Wesfarmers CSBP	http://www.wesfarmers.con.au	Australia	990,000 tCO2e for 1995 (the latest data available)	20% emissions reduction by the end of 2000, no updated commitment was released	198,000 tCO2e until 2000, no post-2000 commitment	No	Member of the Australian "Greenhouse Gas Challenge" program	N/A
Healthcare	Baxter International	http://www.baxter.com/investors/citizenship/environmental/index.html		0.75 MtCO2e in 1999 5.77 MtCO2e in 1990	Reduce energy use and associated greenhouse gas emissions by 30% per unit of production value from 1996 levels by2005.	Not known	No	No information	N/A
Mining and Metallurgy	Broken Hill Propriety (BHP Billiton currently)	http://www.bhpbilliton.com/bb/	Australia	32 MTCO2 in 1995; 27.3 MTCO21e in 2001	As BHP Billiton is a newly merged company, it has to create a new GHG inventory and corporate emissions reduction target by 2003; previous Australian GHG Challenge Commitment was to reduce GHG emissions by 5% by 2001 with the base of 1995	The target, which was set to be met before BHP and Billiton merge in 2001: 1.6 MTCO2e relative to 1005 (by 2001)	No	Member of the Australian "Greenhouse Gas Challenge" program	N/A
Mining	Normandy Mining	http://www.normandy.com.au/coail.htm	Australia	606,294 tCO2e for 2000 from Australian operations	10.9% emissions reduction target by 2004 relative to 2000	Approximately 69,000 tCO2e by 2004	No	Member of Australian "Greenhouse Gas Challenge" program	N/A
Mining and Metallurgy	Rio Tinto	http://www.riotinto.co.uk/community/default.asp	Australia / United Kingdom	23	Target of a 5% reduction of on-site greenhouse gas emissions per unit of production by 2001 (with 1998 as a base year)	No information/commitment was released beyond the year 2001	Not known	Under consideration	N/A

Sector	Name	Website	Country	Emissions (1999 or 2000, MT)	Commitment	Quantity	Internal trading?	Outside projects?	Notes
Oil & Gas	BP Amoco	http://www.bp.com/corp_reporting/hse_perform/env/climate_change/evidence.asp	UK	72.2 (other sources indicate 78 MTCO2e)	-10% from 1990 level by 2010.	Approximately 8 MTCO2e	Yes - 2.7 MtCo2 traded at about $7.5 per ton CO2	To be seen in 2001. No final decision known	Baseline is difficult to establish - no compatibility between the document on emission trading Feb. 2001 on baseline and the bp website - so called "credit based" (preparing for CDM/JI) in 2001 PCF Participant Partnership for Climate Action Member
Oil & Gas	PEMEX	http://www.pemex.com	Mexico	177 MtCO2e in 1997 (NRCD data) or 44 MTCO2e in 1999	A 1% reduction in 2001 relative to the baseline of 1999-2000, and each subsequent year -- to decrease emissions by the additional 1% until 2010	Would represent approximately 1.8 MtCO2e per year, or 18 MTCO2e by 2010	Yes	Recommended	Partnership for CCX member
Oil & Gas	Royal Dutch - Shell	http://www.shell.com/royal-en/content/0,5028,25544-51036,00.html	Netherlands	114MTCO2 equivalent in 1990	A 10% reduction by 2002 relative to 1990, but unclear beyond 2002; the target is 103 MTCO2e by 2002	Approximately 13-14 MTCO2e	Yes	Trading is only within Shell Annex B operations - setting up a Shell internal CDM mechanism	Include a $5/TCO2 up to 2010 and a $20/TCO2 beyond 2010 in all investment decision Partnership for Climate Action Member
Oil & Gas	Statoil	http://www.statoil.com/ http://www.statoil.com/INF/SVG02304.nsf/UNID/F670B68FE6C94003412569F80060629A?OpenDocument&lang=en&app=2000year	Norway	8.3 MtCo2 in 2000 (uncertainty here)	-1.5 MTCO2 annual reduction compared to baseline by 2010	Approximately 15 MTCO2e by 2010	No	Seem to welcome them	PCF participant

Sector	Name	Website	Country	Emissions (1999 or 2000, MT)	Commitment	Quantity	Internal trading?	Outside projects?	Notes
Oil & Gas	Suncor	http://www.suncor.com/we_care/wecare_globalclimate.html For a very detailed account of their current emissions, commitments and future efforts, see http://www.suncor.com/we_care/pdf/2000VCR%20dec11.pdf	Canada	4.969 MtCO2 in 1990	Meet Canada standards - Company-wide, -1.5% reduction compared to base year for 1990-2002, -1%/year compared to base year for 2003-2008. 6% reduction in GHG compared to 1990 levels by 2010.	Claim base year emissions as 8.5 MTCO2 in 1999, 15.3 MtC02e in 2002, 18.1 MtCO2e in 2005 Project 6.2, 9.2 and 10.1 MtCO2 respectively Hence a demand of 2.3 MTCO2e, 6.1 MTCO2e and 8 MtCO2e in 1999, 2002 and 2005	Not known	Relies extensively on emissions trading. External transactions both within Annex B and in Non annex B countries (Belize) - Forest oriented	Partnership for Climate Action Member
Oil & Gas	Woodside Petroleum	http://www.woodside.com.au/content/news/downloads/2001NovAsianRoadshow.pdf	Australia	22 MTCO2 for 2000 (forecasted data, no records for 2000)	Pre-2000 emissions reduction commitment of 25% relative to 1995; no post-2000 commitment is available	20 MTCO2 per year by 2000 on the product lifecycle basis through the use of LNG, no post-2000 commitment data available	No	Considering JI/CDM, but no specific information	The company is actively researching terrestrial CO2 sequestration; Woodside has set up a greenhouse gas advisory subsidiary
Pharmacy	Johnson & Johnson	http://www.jnj.com/who_is_jnj/2000_enviro/2000_Environmental_Report.pdf http://www.panda.org/news/press/news.cfm?id=1867	US	Estimated 1.5 MtCO2e emissions in 1991 **from energy consumption**	For its Climate Savers commitment, Johnson & Johnson pledged GHG reduction by 7 percent below 1990 levels by 2010, with an interim goal of four percent below 1990 levels by 2005.	If 1990-91 is the base year, would give 0.105 MtCo2 additional per year by 2010, and/or 0.06 MtCO2 by 2005	Not known	They already have some very small planting operations in the US;	Member of Climate Savers (partnership with WWF and Center for Energy and Climate Solutions)
Photographic cameras and films	Eastman Kodak	http://www.kodak.com/US/en/corp/environment/commitment/goals.shtml	US	Unclear - Down by 8% in 2000 compared to the reference (apparently, 1997 level, but different sources indicate 1990)	*Reduce energy use by 15% of 2000 levels by 2004 *Reduce GHG emissions from electricity use by 20% of 2000 levels by 2004	Not known	Not known	Not known	N/A

Sector	Name	Website	Country	Emissions (1999 or 2000, MT)	Commitment	Quantity	Internal trading?	Outside projects?	Notes
Semiconductors	Intel	http://www.intel.com/intel/other/ehs/EHS_fin.pdf	US	3.3 MTCO2e for 2000, **half of which** from PFCs	Voluntary agreement to reduce PCF by 10% below 1995 levels by 2010 (according to BELC compared to the 1990 levels) Reduce energy use by 10% during 2001.	Approximately 0.3 MTCO2e by 2010	No	No apparently	Mean GWP of a PFC is about 8,000
Semiconductors/other	Motorola	http://www.motorola.com/EHS/environment/leadership/air.html	US	No data on 1995 emissions	Reduce PFC by 50% in 2010 from 1995 level	Not known	Not known	Not known	N/A
Specialty products and paints	ICI (Imperial Chemical Industries)	http://www.ici.com	UK	6.7 MTCO2e for 2000	Post-2001 commitment is to reduce GHG emissions by 5% per ton of product	N/A (the emissions reduction target is structured on the per ton/product basis)	No	No	Member of the British MACC2 program ("Making a Corporate Commitment")
Real Estate	Land Securities	http://www.landsecurities.com	UK	Not released	Reduce emissions from company-managed properties by 10% by 2010	If the managed property portfolio remains the same in 2010 as it stood at 2000, the total emissions reduction commitment would be 4.64 tCO2e.	No	No	Member of the British MACC2 program ("Making a Corporate Commitment")
Retailer of Clothing, Food, Home wear and Financial Services	Marks & Spenser Plc.	http://www2.marksandspenser.com/thecompany/ourcommitmenttosociety/environment/reports/Environmental_Targets.PDF	UK	Not released	Emissions reduction target is a 5% reduction of energy use by the end of 2002	N/A	No	No	Member of the British MACC2 program ("Making a Corporate Commitment")

Sector	Name	Website	Country	Emissions (1999 or 2000, MT)	Commitment	Quantity	Internal trading?	Outside projects?	Notes
Various products and services	ABB	http://www.abb.com/	Switzerland	In 2000 -- approximately, 1.1 MTCO2 e; reduction of 481,000 tCO2e from 1998 to 2000; additional reduction of 4 TSF6 for the same period	*Plant-specific energy efficiency targets. *Reduce GHG emissions by 1% per year between 1998 and 2005	Approximately 0.1 MTCO2e per year until 2005	Not known	Not Known	The emissions reduction plan includes a product target in addition to plant environmental targets (Environmental Product Declarations for all major product lines).
Semiconductor/electronics, various related products	Sony	http://www.sony.com/SCA/index.html	Japan	1.7 MTCO2e form energy use and 8.1 MTCO2e from product use	Reduction of GHG emissions by 15% by 2005 (reduction per unit of sales); increase renewable resource use by 5%; additional emissions reduction targets for Sony transportation and Sony logistics (see report)	Approximately 0.25 MTCO2e if only energy consumption considered (until 2005)	Not known	Under discussion	
Aluminum	Australian Aluminum Council	http://www.isr.gov.au/agendas/Sectors/LightMetals/lmaa.pdf	Australia	18 tCO2e per ton of aluminum in 1999; 4.1 MTCO2e for 1999 for all members of Australian Aluminum Council	Pre-2001 Commitment was to reduce total GHG emissions by 22 % per ton of aluminum by 2001 relative to 1990 base year	Cannot be estimated since no post-2001 commitment is released	Not known	Not known	Member of the Australian Greenhouse Gas Challenge Program (all industries belonging to the Aluminum Association are)
Forestry	The Nature Conservancy	http://nature.org/	USA	4 Projects: Belize, Bolivia, USA; the nature conservancy does not contribute to emissions -- it is an entity working to implement carbon offsets	Belize: 2.4 MTCO2e over 40 years. Bolivia: 7 MTCO2e over 30 years. Brazil: During the next 40 years, it is expected to reduce, avoid or mitigate approximately 1MTCO2e. USA: project will reduce, avoid or mitigate approximately 150,000 tCO2e during the next 40 years by bringing back native forests to this area.	About 10.5 MTCO2e over the next 40 years.	No	Yes, CDM	Member of CCX

Sector	Name	Website	Country	Emissions (1999 or 2000, MT)	Commitment	Quantity	Internal trading?	Outside projects?	Notes
Various	Partnership for Climate Action	http://www.environmentaldefense.org/pubs/Filings/PCA.html		Claim joint 360 MTCO2e/year	Announced they would reach collectively 280 MTCO2 by 2010.	Depends on individual company	N/A	N/A	This partnership includes Dupont, Shell, BP, Alcan, Pechiney, Suncor and Ontario Power + Pemex. Trading (either within or outside Annex B) is one of its key objectives.
Various	Voluntary ER from US Energy Act 1992	www.eia.doe.gov/oiaf/1605/vrrpt/index.html	US	78 entities reported 1.5 btCo2 in 1999 (22% of total US emissions) - Claimed that they have reduced emissions by 185 MtCo2e in 1999.	N/A	N/A	N/A	N/A	No commitment involved
Various	Chicago Climate Exchange	http://www.chicagoclimatex.com/	US	Not reported	The 2% reduction of GHG emissions below 1998 levels by 2002 and a further 1% reduction per year for an indefinite period after 2002.	Not known	Yes	Yes	N/A
Various	Keidanren	http://necsv01.keidanren.or.jp/english/policy/2000/055/report.html	Japan	478.65 MtCO2 in 1999	Same level in 2010 than in 1990	Not known	Not known	Yes	N/A
Various	GEMCO	Http://gemco.wwww.com	Canada	N/A	N/A (Various companies comprise this organization)	Approximately 6.9 MTCO2e	Yes	GEMCO is deliberately set up as an emissions trading association, similar to Chicago Climate Exchange	Various

Section IV (D). Renewable Energy Updates: National Renewable Policies and Private-Actor Initiatives

Markets for renewable energy and carbon are tightly interconnected, since proliferation of renewables directly affects the demand for- and the price of carbon credits. As a result, EcoSecurities' Market Intelligence Reports #1 and #2 provided insights on the features of the European and North American energy infrastructure, fossil fuel and renewables policy that could impact on the carbon market. In this issue, we update our previous analyses by reviewing post-Marrakech policy and private sector developments in the renewable energy sector. We further provide detailed review of the EU renewable energy policies in Appendix IV.

We have to note at this stage that the renewable energy market is highly dynamic relative to the still-nascent carbon market, especially with respect to the number of private sector deals and initiatives. In the present review, we focus on the policies and private sector initiatives, which – in our opinion – are most likely to have a lasting effect.

In Appendixes II and IV the reader will find detailed reviews of national energy policies with regard to renewables, which we commenced in our earlier reports: Appendix II focuses on Japan, New Zealand and Australia. Appendix IV provides the same information for the members of European Union.

Policy

Australia

Australia's Green Electricity Market (GEM), launched in April 2001, established a precedent for the use of market mechanisms to meet mandatory renewable energy obligations. Accompanying the obligation was the development of the world's first marketplace for *mandatory* renewable energy certificates (RECs). GEM remains a functioning project between the Australian electricity industry and *The Marketplace Company* (M-co) to establish a registry, electronic trading and compliance platform for green electricity rights. For a more detailed background of the Australian Renewable Energy Obligation and green electricity market, see Appendix II.

The newest development in Australia's renewable energy domain for November-January is the government's expression of interest in subsidizing new ethanol production facilities. [53] Australia's government is already promoting ethanol by exempting it from fuel excise tax, but it still has to pass specific regulations on ethanol-gasoline blending, which continue to worry gasoline producers. To attract oil companies, the government is being advised to launch a subsidy of 16 (Australian) cents per liter for new or expanded biofuel capacity, or 16 percent on new plants.

[53] http://www.planetark.org/dailynewsstory.cfm/newsid/13743/story.htm

Belgium

On 7 December, the Federal government adopted a new decree on green electricity, which fixed minimum prices on green certificates for nearly all renewables. For example, the price of an offshore wind's REC was set at 8.6 Eurocents/kWh.[54]

Denmark

The Danish green certificate system has again been put on hold. Originally included in the electricity sector reform law passed in 1999, the market for tradable renewable energy certificates was supposed to be running by the beginning of 2000. This timetable was changed on several occasions, but the target date for the system launch was eventually set at 1 January 2003. However, this target is again being reconsidered: as of January 2002 it remains unclear when, or even if, this obligation-based system will begin.

Japan

Similar to Australia, Japan is considering blending ethanol with gasoline to reduce GHG emissions. According to Tsuneo Takeuchi, director of the climate change policy division in the Environment Ministry's global environment bureau, mandatory use of ethanol as a fuel additive for cars, using the same blending ratio as that of Brazil, would reduce Japan's CO2 emissions by roughly two percent. In anticipation of government action, Mitsui, a Japanese trading house, has signed an agreement with Brazil's Coimex Trading to develop a Japanese market for imported sugar-based ethanol.[55]

Netherlands

Two major Dutch renewable energy developments have taken place in the past three months. First, in Fall 2001 the Dutch Government launched an incentive scheme to induce consumers to buy 'clean' cars. Under the scheme, the government will reward consumers with up to Euros 1,000 (approximately US$887) if they purchase a low-CO2-emitting car. Cars will be rated from A to G according to their GHG emission potential and will be eligible for incentives on a sliding scale designed according to car rating. For example, buyers of B-rated cars will receive Euros 500 (US$443) while purchasers of the cleanest cars, A-rated ones, will receive the full pay of Euros 1,000 (US$887).

Second, as of 1 January 2002 phase two of the liberalization of the Dutch green energy market officially enters into force. Green energy suppliers are now responsible for both the purchase of green certificates and the physical electricity supply.

France/Germany

On 15 January 2002, the European Commission once again approved a French request for EU approval of tax breaks on certain biofuels, which was previously challenged by BP.[56] In November 2001, the EU Commission also proposed draft biodiesel targets requiring that all

[54] http://www.greenprices.de/de/newsitem.asp?nid=264
[55] http://www.abcnes.go.com
[56] see http://europa.eu.int/eur-lex/en/com/pdf/2001/com2001_0744en01.pdf

member states use 2.5 percent biofuels in place of petrochemical fuels by 2005. The November proposal specified that countries with biofuel tax break schemes in place by 1 January 2001 should be allowed to keep them, effectively clearing the way for France's biofuel tax breaks.

However, the German government continues to question key elements of proposals from the European Commission to promote the use of biofuels Union-wide, particularly its ideas on biofuel taxes. Germany has no biofuel taxes at this point and opposes the imposition of *any* tax on biofuels. In addition, Germany continues to remain pessimistic about the ability of the EU to reach the abovementioned use of 2.5 per cent biofuels by 2005. [57]

Germany

In late Fall 2001, Germany's Parliament agreed to increase FY2003 subsidies for four kinds of renewable energy: solar, thermal, biogas and geothermal. The total value of subsidies is to be increased to 400 million marks from the 300 million dedicated to renewables in 2001.[58]

In parallel legislation, in mid-December 2001Parliament approved the shutdown of 19 German nuclear reactors over 20 years. .[59] The law, signed by Chancellor Schroeder in June 2001, was passed in the lower house of Parliament by the coalition government of Schroeder's Social Democrats and the Greens. The nuclear plants' shutdown will have to be carried out by 2021, with the first facility to be closed in 2003. This action places even higher pressure on Germany's renewable energy generating capacity.

United Kingdom

The biggest renewable energy news in the United Kingdom is discussion of doubling the national renewable energy target. The UK government already has a target of increasing generation from renewable energy sources to 10 per cent by 2010. EcoSecurities received reports indicating that the UK is now planning for a fifth of all electricity to be generated by renewable energy sources by 2020.[60] The proposed new target of 20 per cent renewable energy generation would make Britain one of the most environmentally friendly energy producers in Europe, but might raise substantial issues about the location of unpopular wind farms on the mainland as well as offshore.

There had been suggestions that the government's current energy review would propose a massive expansion of nuclear power, with as many as 10 to 15 new stations commissioned. However, EcoSecurities was not able to confirm the UK government's final policy stand on the expansion of nuclear production.

Renewable energy currently generates 2.6% of electricity in the United Kingdom. Of that 2.6%, only 1/10th is wind energy. At the same time, the UK already has 40% of Europe's onshore wind resources.

To take the pressure off meeting renewable energy obligations through wind power, at the beginning of November 2001 the UK began offering energy companies three million pounds

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[57] http://www.planetark.org/dailynewsstory.cfm/newsid/13213/story.htm
[58] This action is in contrast to Economics Minister Werner Mueller who had wanted to cut financial support for the sector. http://www.planteark.org, Reuters, *German Parliament ups subsidies for Green Energy*, November 16, 2001
[59] http://www.energycentral.com/sections/newsroom/nr_article.cfm?id=2577554
[60] http://www.guardian.co.uk/guardianpolitics/story/0,3605,611630,00.html

(US$4.39 million) to help develop *solar* power systems for public buildings like schools, churches and hospitals.[61] Britain wants green electricity production to grow from its current level of 2.8 percent to 10.4 percent by 2011 in order to help cut greenhouse gas emissions; solar and wind power are the play principal roles in this plan.

Private Transactions/Contracts

- Eight international companies (including Endesa, Gamesa Energia, Iberdrola, Fuerza Eolica, Dewind, ABB Finland and Fuhrlander) will pool their resources to build a 6,000MW wind park on the Tehuantepec isthmus of Mexico's Oaxaca state. Upon completion of the US $5 billion project, the companies will sell electricity at a similar price to state electricity company CFE.[62] The project represents the largest wind power pooled-resource financing in Latin America;

- Umweltkontor introduced offshore fund *Umweltkontor Renewable Energy*, to develop up to five offshore projects in Germany, the EU and the rest of Europe. Initial plans involve the fund acquiring all rights for developing Umweltkontor's Adlergrund site in the Baltic Sea and the Cabo de Trafalgar site on the Spanish Atlantic coast. The fund company will later invite other projects. Once planning permission for the wind projects is received, these rights will be passed on for a small fee to the operating companies of the offshore plant for a limited period.[63]

- On 22 January 2002, Shell announced that it would take over the interests of its two German partners in one of the world's largest solar power ventures. Financial details of this transaction were not disclosed, but Shell, which holds 33 percent of Siemens and Shell Solar GmbH, said it had agreed to acquire the 34 percent holding of engineering company Siemens and power utility E.ON's 33 percent stake.[64] Shell believes the venture will cover about 15 percent of the relatively small but rapidly growing world market for solar photovoltaic (PV) cells and panels.

- After several years of successful testing, Switzerland's Deep Heat Mining partnership is looking for private investors to provide the extra funding needed to exploit a project on hot dry rock bed in the Basle region for a geothermal power station that has the potential to become Europe's biggest geothermal electricity generator;[65]

- According to Noun's spokesperson, the Dutch utility is planning in the coming years to invest billions of euros in Spanish wind energy. The company wants to build wind farms in Andalusia, Aragon and the Canary Islands, among other locations.[66]

- The 6.5-billion-yen facility comprising 25 Danish-made windmills on a 500-hectare site in Higashidori Village became Japan's biggest wind farm in late Fall 2001. The facility started to supply electricity to Tohoku Electric Power Co. beginning early November,

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[61] http://www.planetark.org/dailynewsstory.cfm/newsid/13078/story.htm
[62] http://www.eyeforenergy.com, ***Mexico to get 6,000MW Wind Park,*** December 18, 2001
[63] Information obtained in private interviews and from the Financial Times' *Renewable Energy Report* (December 2001).
[64] http://www.planetark.org/dailynewsstory.cfm/newsid/14168/story.htm
[65] The report is taken from the December issue of FT-Renewable Energy Report
[66] http://www.energycentral.com, Dutch Nuon to invest billons of Euros in Spanish wind in the coming years, November 2, 2001

with a power output of 32,500 KW. The Japanese Ministry of Economy, Trade and Industry (METI) hopes to boost the nation's overall wind power generation capacity to 3 million KW by 2010 from about 140,000 KW at the end of 2001 in response to growing demand for clean energy.

Tomen (the facility operator) is currently selecting another site from 40 locations nationwide.[67]

At the same time, Vestas Wind Systems, the Danish wind turbine manufacturer, anticipates orders from Japan for 31 wind turbines. The order is said to be worth about DKr250m. Japan's wind turbine capacity is expected to increase five-fold by the end of 2005. In addition, Electric Power Development Co., the 50 per cent state-owned Japanese company, is planning to use 12 of Vestas' large wind turbines in a wind turbine park to be launched in December 2003.[68]

- Wind energy is to be better exploited in Switzerland by the construction of a few large wind farms. The expansion of wind farms in Switzerland is hoped to increase the country's use of wind power by 10 to 20 times its 2001 levels by 2010. At present, Switzerland is third from bottom on the league table of European wind power producers.[69]

[67] http://www.energycentral.com, Investing in Japan is financially attractive, November 11, 2001

[68] http://www.energycentral.com, Japan's Biggest Wind Generator Starts Operating, November 8, 2001

[69] http://www.energycentral.com, Wind Power is expected to increase 10-20 times by 2010 in Switzerland, November 7, 2001

APPENDIX I

CORPORATE VOLUNTARY COMMITMENTS

Disclaimer:

The present appendix, as all the other parts of this report, is being provided for information purposes only. The PCF Trustee does not make any warranties or representations of the accuracy, reliability or completeness of any information included in this appendix, or any other part of this report. The sole responsibility for the data and information provided lies with EcoSecurities Ltd.

1. INTRODUCTION

A new Pew Center on Global Climate Change report Released in November 2001 highlights that:

> *"A number of underlying themes emerged regarding companies' motivations for setting [emissions reduction] targets. Among the most salient are these: […] setting and meeting the target will improve their bottom line and drive innovations. […] over the long run, the world will have to deal with climate changes, so their [corporate] climate -friendly investments will pay off. […] by taking the initiative, [corporations] can help the government to create a climate change policy regime that works well for business. It is one thing to advocate policies such as reasonable targets and timetables and flexibility for businesses to use various means (such as emissions trading) to implement clearly defined goals. It is another thing to actually demonstrate via corporate action that these measures work."*[1]

However, in adopting voluntary targets, companies are also accepting risks. These risks include the possibility of the government not recognizing early actions or selecting a late year as baseline, thus rendering voluntary emissions reductions less valuable. In addition, government may choose not to impose emissions reductions obligations at all.

Nevertheless, in two-thirds of European jurisdictions and all over North America, Japan and Australia voluntary emissions reduction targets are gaining increasing acceptance as a way of inducing corporate participation in GHG emissions reductions programs. As a result, any analysis of GHG developments would be incomplete without the consideration of corporate emissions reductions initiatives. It is for this reason that EcoSecurities focuses this Third and final greenhouse gas report on voluntary actions by reviewing initiatives across North America, Scandinavia, the UK, France, Germany, Switzerland, Australia and Japan.

[1] Margolick, Michael and Russell, Doug. 2001. "*Corporate Greenhouse Gas Reduction Targets*", Pew Center on Global Climate Change.

2. GENERAL CHARACTERISTICS OF VOLUNTARY EMISSIONS REDUCTIONS INITIATIVES

The first important issue to mention about corporate emissions reduction targets is their heterogeneity, which is emphasized in the above-mentioned Pew Center report. Observation shows that companies have adopted different kinds of targets depending on the nature and location of their business units, on their business models and on the specifics of their production activities. For example, some GHG emissions reduction targets apply to purchases, others to a company's own energy use and yet others to products. Some companies have chosen to adopt absolute emissions ceilings while others tie their objectives to indicators of output levels and/or revenues. Last, some companies set the emissions targets through a 'top-down' approach, that implies a cumulative corporate target without investigating the individual plant-by-plant emissions reduction opportunities, while others choose a 'bottom-up' approach based on reviewing emissions reduction options for each corporate plant.

To illustrate the above point two corporate commitments not analyzed on the following pages are outlined below.

- **Ford Motor Company** (USA)[2] has developed a well-known 'in-kind' GHG reduction commitment. Namely, the company pledged to improve the fuel efficiency of its SUVs by 25 percent relative to the base standard of 2001 by year 2005. This represents a non-direct emissions reduction commitment aimed at reducing GHG emissions through the life cycle of Ford's products.

  At the same time, Ford also pledged to reduce GHG emissions from its *European* car fleet by 25 percent relative to the emissions recorded in 2001 levels by 2005. And as a third type of commitment, Ford has begun installation of solar power generation technology at its Wales facility (UK).

- **Interface Corporation (USA),** is a large producer of commercial carpets and of products/services supporting each other in interior design, such as air distribution systems, cable/wire management and floor caring services.[3] Interface Corp. aims at reducing non-renewable energy use per unit of output by 15 percent by 2005 (base year 1996). The company has also agreed to increase the share of renewable energy in total corporate energy consumption to up to 10 percent by year 2005.

This form of commitment is the most widespread corporate "emissions reduction target" in Annex B.

It is important to note that quantifying the emission reductions through this program is very difficult. This quantification requires detailed information about the current energy mix the firm consumes as well as information on the renewable energy mix it plans to use as a substitute .

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[2] EcoSecurities chose not to provide a detailed analysis of Ford Motor Company below since a number of other sources have elucidated Ford's GHG reduction activities. We include Ford's GHG commitments in our cumulative emissions reduction spreadsheet attached to this Appendix.

[3] Claiming to be the largest commercial carpet manufacturer in the world, the company employs 7,700 specialists worldwide generating about 40% of all commercial carpet sales in the world.

3. SCOPE OF THE PRESENT REVIEW

Due to the great heterogeneity of corporate GHG emissions reduction commitments, This report focuses only on the largest companies, which have adopted quantified emissions reduction targets. When feasible, commitments are converted into expected tonnage of emission reductions. However, conversion is not possible for a number of companies as these entities did not reveal their emissions volumes in the base year arguing that their corporate GHG inventories need adjustments after recent acquisitions, divestments and/or other structural changes.

This report is not and does not intend to be a *comprehensive* review of *all* voluntary corporate commitments. Information provided within the report is valid to the best of EcoSecurities' knowledge. Information on which inferences are based come from direct sources -- i.e. from the parties announcing emissions reduction commitments.

The report does not constitute an external *validation* of individual claims on GHG emission reductions, nor does it constitute an attempt to validate any of the claims released by the interviewed/researched businesses. Thus, this review simply aims at summarizing the information the companies *chose to make public*.

This report focuses on corporate entities with the following general characteristics:

a) Entities not reviewed in alternative publications-- IBM, Shell and UTC, which are extensively analyzed in the 2001 Pew Center Report[4] and/or BP the commitment of which is described by multiplicity of sources including RFF[5], Union of Concerned Scientists[6] and others were excluded. In sum, we focus on non-widely publicized commitments;

b) Entities with substantial volume of GHG emissions relative to the approximated sectoral average (usually in *high* thousands of tCO2e or *low* MTCO2e, depending on the nature of business);

c) Businesses, which were recommended to us in confidential interviews with national GHG authorities in lieu of their active participation in government-sponsored voluntary emissions reductions programs.

The second issue emphasize before committing to the detailed description of individual agreements is that a *large number* of companies involved in emissions reduction actions are joined in nation-wide trade unions, which historically have formed via industry-wide bargaining bases (as in Finland, Norway, Germany and, to an extent, in the UK). Alternatively, in the absence of such bargaining/organizational structures, such businesses have formed voluntary emissions reduction associations headed either by a respectable non-profit, or by an overarching information clearance Center[7] (as in the United States). We elaborate on this point in the next page. Hence, several emissions reduction targets will be reported for sectoral entities rather then

[4] http://www.pewclimate.org/projects/ghg_targets.pdf: Michael Margolick and Doug Russel: "Corporate Greenhouse Gas Targets", Pew Center, November 2001.
[5] Weathervane: http://www.weathervane.rff.org/refdocs/nyt.html
[6] http://www.ucsusa.org/environment/ges1.pdf
[7] Such information clearance center would again be a non-profit organization: see below.

for individual companies. The best example of such a target-setting process would be the Australian Aluminum Industry Agreement.

The third interesting feature observed is that most of these voluntary actions are initiated in the US, Australia and Canada. We chose not to speculate on the reasons why this form of action is more prevalent in these countries. We simply note that, for US firms with operations in Annex B countries, a voluntary commitment is the only way to align US based business with their companies' overseas operations, which are more susceptible of being subject to a Kyoto related constraint.

In the EU, less emphasis on voluntary actions of individual corporations and more emphasis on governmental regulations is observed, though some regulations call for voluntary initiatives by firms. In addition, Europeans tend to rely more on the emissions reductions initiatives formalized through industrial associations, such as VIS (German Chemical Industry Association)[8] or the Norwegian Aluminum Association. While such initiatives remain voluntary, they are usually of a different kind because a great deal of EU agreements are pledged in direct exchange for either a reduction of a carbon tax (the story with the British Climate Change Levy) or an agreement from the regulator not to impose an emissions reduction cap on energy-intensive sectors (e.g. Germany).

This report distinguishes between 'individual voluntary emissions reduction commitments, such as the ones volunteered by Nike, Cinergy, OPG, Alcoa, DuPont and '*institutionally-driven* semi-voluntary emissions reduction Agreements characteristic to most EU states reviewed below. For the purpose of environmental integrity, it is noted that the latter are as good as (if not better than) the former, as long as they lead to *observable* and *verified* [9]emissions reductions.
Fourth, as mentioned above, a number of volunteer international non-profit intermediaries assisting businesses in understanding technical GHG issues have emerged. They include:

- Partnership for Climate Action (PCA), created in 2000 by Environmental Defense . PCA includes BP Amoco, Royal Dutch-Shell, DuPont & Co.; Suncor Energy Inc., Ontario Power Generation Inc. (OPG), Alcan Inc. and Pechiney SA and PEMEX in addition to 40 others;
- Pew Center's Business Environmental Leadership Council, which includes 32 members (as of Fall 2001), with an expected growth to 50 in half-a-year[10]; and
- The US-based Business Council for Sustainable Energy (BCSE) that counts 39 corporate and trade association members; its sister organization – the European Business Council for Sustainable Energy Future – operates across the Atlantic.[11]

8 However, within sectoral agreements large corporate entities have to develop individual emissions reduction targets, which have to be consistent with the sectoral GHG abatement obligations – see profiles of BASF (Germany) and Elkem (Norway).

9 In 'institutionally-aided' Agreements it may be easier to monitor and verify GHG emissions reductions in the first Kyoto Commitment period relative to the countries with 'pure' voluntary agreements for a number of obvious reasons.

10 Current membership includes: ABB, American Electric Power, Intel, Interface, John Hancock, Alcoa, Air products, Baxter, Maytag, Boeing, British Petroleum, Ontario Power Generation, PG&E Corporation, CH2Mhill, Rohm & Haas, Cinergy, Cummins Inc. , California Portland Cement Company, Rio Tinto, Sunoco, Deutsche Telecom, DTE Energy, Du Pont, Toyota, TransAlta, United Technologies, Entergy, Weyerhaeuser, Enron, Georgia-Pacific, Whirlpool, Wisconsin Energy Corporation, Holnam, Waste Management Inc., and IBM. For details on the Pew Center program check: www.pewclimate.org/belc/index.cfm

11 EcoSecurities does not mention here the *International Emissions Trading Association* (IETA) since this professional group serves more as a forum for professional information exchange; IETA does not necessarily guide individual companies through their GHG-related actions.

Conditions for membership are as follows. For joining the Pew Center's *Business Environmental Leadership Council*, firms must accept the view "that enough is known about the science and environmental impacts of climate change to warrant action." Environmental Defense's PCA requests members to share their GHG reduction practices in addition to *setting stringent greenhouse gas emissions reduction targets*. BCSE focuses on encouraging the control and reduction of greenhouse gas emissions through the maximum use of market mechanisms. [12]

It is expected that these organizations will continue to play a significant role in the US in the long term.

4. UNITED STATES

Despite the fact that the United States has shown little interest in committing to the requirements of the Kyoto Protocol, several US companies have engaged in voluntary GHG emission reduction commitments.

The onset of voluntary corporate action in the United States has come primarily in the wake of the Energy Act of 1992, which set up a voluntary GHG emissions reduction program. In lieu of the Act's implementation, 201 entities reported claiming 226 MtCO2e of greenhouse gas emissions reduction in 1999.[13]

Currently there are several semi-formalized governmental agreements in the US, which encourage GHG reductions:

- Voluntary Aluminum Industrial Partnership (a USEPA program, which focuses on the reduction of PFC emissions from aluminum production), which claims PFC reduction of 44% relative to the 1990 levels by 2000 (equivalent to 2.2 MMTCe). The partnership reports 13 primary aluminum producers, representing 22 smelters and 94 percent of US production capacity.[14]
- Voluntary Semiconductor industry agreement with the USEPA, that stipulates the reduction of perfluorocompounds by 10% relative to the 1995 levels by 2000;[15]

[12] The same goal is pursued by the North American Emissions Marketing Association (EMA), which focuses, nevertheless, on all types of production-to-air discharges – not just greenhouse gases.

[13] In November 2001 The *US Voluntary Reporting of GHG Program* announced a strong growth in the national GHG reporting cycle. By the end of 2001, the program has reported 222 organizations submitting their GHG emissions reports. Such reporting progress represents an 11 percent increase in voluntary GHG reporting relative to 2000. The number of reported voluntary greenhouse gas reduction projects has increased by 8.4% and has reached 1,882. For the hard copy of this report go to the "What's New" section of the following web-page: http://www.eia.doe.gov/oiaf/1605/new.html

[14] Among the companies participating int his program in 2001 the USEPA reported: Vanalco, NSA (a division of Southwire), Northwest Aluminum Company, Century, Noranda Aluminum, Reynolds Metals, Columbia Falls Aluminum Co., Kaiser Aluminum, Alumax, Alcan, Alcoa and Goldendale. The program continues to operate after the announcement of President Bush's new climate change policy.

[15] The semiconductor industry are the only group working globally to reduce greenhouse gas emissions. As part of the US semiconductor GHG Initiative, twenty-one companies, many of them based in Silicon Valley, belonging to the Semiconductor Industry Association signed the voluntary agreement in March 2001. Among the companies participating are Intel Corp., Advanced Micro Devices Inc. and NEC Electronics Inc. Intel is also a member of the aforementioned Pew Center's Business Environmental Leadership Council.

- The USEPA's *Green Power Promotion Program*, the members of which are united around the idea of reducing their emissions through switching to renewable energy consumption. In this group, 20 US business and other entities have agreed to purchase at least 10 percent of electricity from renewables saving an estimated 200,000 tons of CO2e. In 2000 the group included such firms as Fetzer Vineyards, Ford Motor Company and Johnson &Johnson.
- Fanny Mae 's national emissions trading program, still under development, focuses on encouraging the reduction of residential greenhouse gas emissions. In June 2001 Austin Energy reported to be the first public power utility and the second electric utility in the United States to participate in the scheme. The program projects the total volume of GHG emissions reduction from 2002-2012 to be about 250,000 TCO2e.[16]

Among the best-known *private-sector* greenhouse gas emissions reductions initiatives is the Chicago Climate Exchange emissions trading pilot, which represents the first *regional* U.S. voluntary program for greenhouse gas trading. As of completion of this report, there were 37 companies participating in the design phase of this program in the US Midwest. Each company has committed to a 2% reduction of its GHG emissions below 1998 levels by 2002.

Participants have further committed to an additional 1% reduction per year for an *indefinite* period after 2002. The largest Chicago Climate Exchange members include (among others): Alcoa, Cinergy, Dupont, Estman Kodak, British Petroleum, Suncor Energy, NUON, DuPont, Calpine, Ontario Power Generation, PG&E National Energy Group, SC Johnson, Waste Management and Ford Motor Company. [17]

Below detailed commitments for some of the *Chicago Climate Exchange* participants are examined. Review of all of participants is not plausible due to the rapid evolving of the initiative and lack of published information on member companies. The US section ends with a review of commitments from firms, which do not participate in the CCX.

[16] These reductions have to be achieved solely through energy conservation and other demand-reduction measures promoted by utilities. Original plans for emissions trading included the provisions that Fannie Mae would aggregate CO2 credits from utilities around the country and market them on a world-wide basis. CO2 savings from residential energy efficiency program totaled 11,000 tons in 2000. No data are available for 2001, and the pace of program development has somewhat slowed down. EcoSecurities obtained information about the development of this program through a number of confidential interviews with Fanny Mae employees who would not name the exact number of utilities which have tentatively agreed to participate in this program.

[17] As of January 2002 the full list of Chicago Climate Exchange members included: American Agrisurance, British Petroleum, Calpine, Carr Futures, Cinergy, City of Chicago, CMS Generation, Detroit Energy (DTE), Ducks Unlimited, DuPont, Exelon, First Energy, Ford Motor Company, Growmark Inc., Grupo IMSA, S.A. de C.V., Interface, International Paper, Iowa Farm Bureau Federation, IT Group, Manitoba Hydro, Mead Corporation, Mexico City, Midwest Generation EME, National Council of Farmer Cooperatives, Navitas Energy, Nisource, NUON, Ontario Power Generation, Ormat, Pinnacle West Capital Group Capital Corp., PG&E National Energy Group, Pronatura de Mexico, SC Johnson, ST Microelectronics, Stora Enso North America, Suncor Energy, Swiss RE New Markets, Temple-Inland, the Nature Conservancy, Waste Management, Wisconsin and Zahren Alternative Power. Details about CCX program could be obtained from http://www.chicagoclimatex.com/html/about.html

4.1. Alcoa

Alcoa is the world's leading producer of primary aluminum, fabricated aluminum, and alumina. In 1991 Alcoa's revenue approached $22.9 billion, with 142,000 specialists working across 37 countries.

In 1999 the company announced a strategic framework with a 20-year vision for environmental management. Part of this program focuses on greenhouse gas emissions, which aluminum production creates in substantial volume. The company has committed to reduce its greenhouse gas emissions by 25% in 2010 relative to 1990 levels. If the inert anode technology proves successful,[18] the company would then target -50% for 2010.

As part of its GHG reduction strategy, Alcoa has launched the *One Million Trees* program, by which the company hopes to plant a million of trees by year 2008.[19]

4.2. Cinergy

Cinergy Corporation is one of US's leading diversified energy companies. Cinergy owns, operates and has under development over 21,000 megawatts of electrical and combined heat and power generation. It is the eighth largest electricity-trading organization in the United States.[20]

Since 1995, Cinergy has been a member of the US DOE's Climate Challenge Program. Since 1990 it has reduced its greenhouse gas emissions by about 12 MTCO2e. To achieve further emissions reduction, the company emphasized the need to support carbon sequestration and develop additional capacity in renewable energy.[21] Cinergy has signed commitments to plant 3.5 million trees on domestic preserves over by 2010. This is expected to offset about 2.5 million tons of CO_2 emissions over 50 years. In its carbon sequestration projects, Cinergy works closely with *Nature Conservancy*.
As part of the above GHG reduction initiative, the company has invested about $260 million in renewable energy and energy efficiency projects including 129 megawatts of wind generation, 61 megawatts of biomass generation, six megawatts of hydroelectric power and 3,800 megawatts of combined heat and power generation.

4.3. DuPont

DuPont was founded in 1802 as an explosives company. Since then, Dupont has evolved into a 5,000-employee $28.3 billion revenue (2000) global company focusing on the development and production of chemicals and materials used in apparel, nutrition and food products, energy generation, healthcare, electronics and transportation.

In 1999 the company committed to reduce its corporate greenhouse gas emissions by 65 percent in 2010 compared to 1990. DuPont has already achieved a 45 percent reduction by 2001. Additional commitments include holding total energy use constant relative to the 1990 levels. [22]

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[18] The success of this technology cannot be assessed at this point.
[19] http://www.alcoa.com
[20] http://www.cinergy.com/about_cinergy_corp/corporate_overview/
[21] http://www.cinergy.com/about_cinergy_corp/community_involvement/environmental/media/Environmental_Story/pg12(ReducingCO2Emissions).pdf
[22] http://www.dupont.com/corp/social/SHE/usa/us1.html

Finally, Dupont pledged to derive 10 percent of its global energy use from renewables by 2010. To do so, DuPont has focused on biomass and wind power.

The company emitted 87MtCO2e in 1990 (base year). With 65% emissions reduction from 1990, the total committed emissions reduction volume comes to 56.5 MtCO2e by 2010.

4.4. DTE Energy (Detroit Edison)

DTE Energy (Detroit Edison) is an energy products and services company, including electricity production. The company is the seventh largest US public utility with about a 2-million customer base in the State of Michigan. The company has recently become known in the American Midwest for developing geothermal and solar energy programs.[23]
Currently DTE Energy does not have a direct emissions reductions target. However, referring to the Chicago Climate Exchange, DTE Energy has joined a group of "…energy, manufacturing and environmental organizations and companies working to design a voluntary market that would establish a target to reduce or offset their emissions of greenhouse gases, including carbon dioxide (CO2), by 5 percent from 1999 levels by 2005. "[24]

Since 1995, DTE Energy has been actively involved in greenhouse gas reduction co-sponsoring forest management projects in the United States and abroad and by expanding landfill gas-to-energy resources, improving power plant and electrical system efficiencies, and encouraging energy conservation activities. As a result of these actions, GHG emissions between 1995 and 1998 were reduced to 6.7 MMTCO2e.

4.5. Eastman Kodak

Eastman Kodak is one of the world's most important manufacturers of photo-cameras and all accompanying materials/equipment, including photo accessories, photo transparencies/media, projectors, scanners, photo-chemicals and relevant software. Recently Kodak became involved in aerial imaging, remote sensing and optical products.

The company plans to reduce its energy use by 15 percent relative to the 2000 energy consumption levels by 2004. Eastman Kodak also plans to reduce the GHG emissions resulting from its electricity consumption by 20 percent relative to 2000 levels by 2004.[25]

4.6. Entergy

Entergy Corporation is engaged in power production, energy distribution operations and related diversified services. With employment of approximately 15,000, it posted revenues of $10 billion in 2000. Entergy owns, develops or operates power plants generating 30,000 MW of electricity domestically and internationally.

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[23] http://www.detroitedison.com/productsServices/geothermalProgram.html
[24] http://www.dteenergy.com/community/environmental/greenhouseGases.html and http://www.dteenergy.com/pressRoom/pressReleases/chicagoClimateExchange.html
[25] http://www.kodak.com/country/US/en/corp/environment/1998/kodakPark/energyConservation.shtml.
The company is also a member of the 1998 USEPA's agreement with 23 semiconductor companies on the reduction of PFC (perfluorocompounds) and HFC (hydrofluorocarbons) emissions. For details see: http://www.kodak.com/country/US/en/corp/pressReleases/pr19980205-01.shtml

By the end of 2000 Entergy had reduced its GHG emissions by 35 MTCO2e from 1991 levels.[26] In 2000 alone the company reduced its emissions by 6.95 MTCO2e. The majority of emissions reduction (82%) is implemented through the expansion of nuclear capacity or/and availability improvements; however, the company emphasizes that it relies on energy efficiency improvements and on obtaining external carbon offsets to a higher extent than on expansion of nuclear capacity.[27]

Entergy plans to stabilize corporate CO2 emissions from US power generating facilities at 2000 levels in 2005. Entergy was the *first* US utility to announce this emissions stabilization goal. The company specifically emphasized the importance of future international flexibility mechanisms (including emissions trading) in meeting its GHG emissions reduction obligations.[28]

4.7. IBM

IBM is an $88.4 billion information technology firm with 316,303 employees worldwide (2001). IBM specializes in production of advanced information technologies including computer systems, software, microelectronics, networking systems and data storage devices.

IBM announced a series of greenhouse gas reduction commitments, which would:

- Improve energy efficiency by 4 percent (annually);
- Reduce CO2 emissions by 4% annually through 2004 with 1998 as the base year; [29]
- Reduce the per-unit of production PFC emissions from semiconductor manufacturing by 40% from 1995 levels by 2002;
- Reduce total PFC emissions by 10% below 1995 levels by 2010; and
- Have 90-100% of its new computer models *Energy Star*[30] -compliant each year.

Between 1990 and 2000, the company has conserved about 8.9 billion KWh of electricity, thus preventing emissions of an estimated 5.6 MTCO2e.

IBM estimates the volume of CO2 emissions induced by its energy consumption at about 4.1 MtCO2e in 1998.[31]

In 2000 IBM managed to reduce its CO2 emissions by 157,547 tons through a variety of energy efficiency measures.

With 1998 as a base year, the company's carbon dioxide reduction obligation would translate into 0.164 MtCO2e of incremental CO2 reductions per year, and 0.82 MtCO2e emissions reduction by 2004.

[26] http://www.entergy.com/environment/default.asp
[27] EcoSecurities were not able to obtain information on specific nuclear capacity expansion carried out by Entergy in the late 1990s- 2001.
[28] http://www.entergy.com/environment/leadership.asp# . Environmental Defense works with Entergy on developing its emissions reduction strategy.
[29] http://www.ibm.com/ibm/environment/annual2001/ibmbroch.pdf. The nonprofit Center for Energy and Climate Solutions verifies IBM's GHG emissions reductions. IBM is also affiliated with the Pew Center.
[30] We remind the reader that 'Energy Star' is the US Government's energy efficiency program. For details on this program see our report #2 (October 2000).
[31] http://www.ibm.com/ibm/environment/annual2001/ibmbroch.pdf (Annual Environmental Report 2001)

4.8. Intel

Intel is a leading computer parts manufacturer with 80,000 employees in 45 countries. The company manufactures desktop and laptop components, server and workstation parts and various communications devices. Intel is also involved in software development. In 2000 Intel's revenues reached $33.7 billion.[32]

In 2000 Intel directly emitted 3.3 MtCO2e, half of which was perfluorocarbon (PFCs). Intel is a member of the 1996 semiconductor industry's agreement with the USEPA on the reduction of PFCs emissions from the computer parts manufacturing process. In 1999 the US semiconductor industry entered into an agreement with the European semiconductor manufacturers, under which the industry adopted a target of reducing the GHG emissions by 10 percent by 2010 relative to the 1995 levels.[33]

Currently Intel is in the process of transitioning to the new semiconductor manufacturing process, which is expected to emit only 10 percent of the PFC emissions compared to the production process introduced at the time of the 1996 USEPA agreement.

The company also pledged to reduce its energy use by 10% during 2001.

4.9. Johnson & Johnson

Johnson & Johnson is a manufacturer of health care products for the consumer, pharmaceutical and professional markets. It employs 98,500 persons worldwide. .

Through its '*Climate Savers*' commitment[34] (with *World Wildlife Fund*), Johnson & Johnson has pledged to reduce greenhouse gas emissions by 7 percent below 1990 levels by year 2010, with an interim goal of 4 percent reduction below 1990 levels by the year 2005. The company also reported that in 2001 it had achieved a 23.1 percent cumulative reduction of energy use [since 1991], which is slightly below the company's target of 25 percent of energy use reduction planned for the 1991-2000 period.

Johnson & Johnson's emissions from energy consumption were estimated at 1.5 MtCO2e in 1991. If we assume 1990 and 1991 emissions were similar, a 7% emissions reduction obligation would lead to a commitment to reduce approximately 0.105 MtCO2 by 2010. EcoSecurities could not obtain information on Johnson & Johnson's 1990 emissions.

4.10. Nike

Nike is one of the leading footwear manufacturers in the world. For 2001 the company posted revenues of $2.3 billion .[35] Nike Corporation has become the latest addition to the WWF's *Climate Savers* Initiative.

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[32] http://www.intel.com/intel/annual00/facts.htm
[33] http://www.intel.com/intel/other/ehs/prog4a.htm#subhead2
[34] http://www.panda.org/climate/savers.cfm
[35] http://www.nikebiz.com

The company pledged to reduce the CO2 emissions from its business travel and its worldwide facilities and services by 13 percent below 1998 levels by the end of 2005.[36] The company plans to achieve this goal by pursuing energy conservation projects, purchasing renewable electricity and investing in energy efficiency projects. In general, Nike is committed to the reduction of *energy use* emissions (induced emissions) rather than direct emissions from the company's operations.

Nike also plans to create baselines for Nike's major subcontracted footwear and apparel manufacturing facilities by year-end 2003. Nike pledged to research, evaluate and distribute best practices to its major subcontracted manufacturing facilities. A GHG emissions reduction strategy for these facilities will be determined in 2005.

Currently the company is trying to estimate GHG emissions baselines for freight transportation distributing Nike's products. This work is to be completed by 2003. By 2005 Nike will devise GHG reduction strategy for its logistical operations.

EcoSecurities found out that Nike is planning to implement a wide range of GHG emissions reduction projects in Asia, especially in Vietnam, China and Thailand. However, most of these projects would not fall under the conventional classification of CDM because they would be designed and carried out in-house. Therefore, EcoSecurities understands that Nike is not planning to actively engage in international emissions trading possibly until the first Kyoto commitment period.

4.11. Toyota Motor Manufacturing

Toyota has already gone through two sets of GHG emissions reduction targets. The first target was to stabilize its energy consumption/transportation use CO_2 emissions at 1990 levels by 2005. To achieve this goal, Toyota increased loading efficiency and filling factors to reduce the number of shipments, increased modal shifts and collaborative shipments, and worked to achieve optimal transport routes. As a result of these efforts, Toyota has achieved a reduction of 3,300 tons/year, exceeding the goal of 2,700 tons/year for FY2000.

Toyota's post-2000 GHG emissions reduction (from energy use) goal is to reduce "…energy use by 15 percent per unit of production, from the 2000 base year, which decreases CO2 emissions by 15 percent…"[37] In addition, Toyota has become the first auto manufacturer to meet California's Memorandum of Agreement for putting Zero Emission Vehicles into use.[38]

However, the company is still in the process of *finalizing* its corporate GHG inventory (to be completed in the first quarter of 2004):

> "*Our goal is to develop a database to track greenhouse gas emissions associated with our business operations, including the transportation of vehicles and automotive parts to our dealers and manufacturing plants. Once the database is in place, environmental engineers will study data and results to determine what additional actions we must take to reduce global warming emissions*."[39]

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[36] http://www.nikebiz.com/media/n_wwf.shtml
[37] http://toyota.com/html/about/environment/news_awards/images/01envrep-all.pdf
[38] http://toyota.com/html/about/environment/news_awards/images/01envrep-all.pdf
[39] Ibid., p. 29.

Due to incomplete corporate inventory, EcoSecurities could not obtain the precise volume of GHG emissions in the year 2000. Therefore, we cannot assess the volume of GHG emissions reduction pledged by Toyota Motor Manufacturing for the post-2000 commitment period.

Before discussing other countries, let us briefly mention here a few other US-based initiatives.

4.12. The Nature Conservancy

The Nature Conservancy plans to implement four projects to generate carbon dioxide offsets while operating through contributions from energy firms and other interested entities. The four projects will offset about 10.5 million tons of CO2 over the maximum period of 40 years. The projects are:

- *Belize*: the project will offset 2.4 MtCO2e over 40 years;
- *Bolivia:* will result in the offset of 7 MtCO2e over 30 years;
- *Brazil:* during the next 40 years, the project is expected to reduce, avoid or mitigate approximately 1MtCO2e.
- *USA:* the project will reduce, avoid or mitigate approximately 150,000 tons of carbon during the next 40 years by bringing native forests to their original areas of growth.

Since the late 1990s, a number of energy firms have contributed $35 million to the Nature Conservancy's forestry projects. All projects listed above are financed by a combination of private and public capital.[40]

In return, the companies, implementing organizations and participating governments receive the carbon rights. One such deal, approved in July 2000, is a $10-million investment by General Motors — the largest monetary investment of its kind —enabling the Nature Conservancy and its Brazilian partner, SPVS, to preserve and restore about 30,000 acres of endangered rain forest.[41]

4.13. Voluntary Aluminum Industrial Partnership (VAIP)[42]

Under the Partnership several companies have committed jointly to reduce PFC emissions 40% from 1990 by year 2000 (~2.2 million metric tons of carbon).

5. CANADA

5.1. GEMCO (Greenhouse Emissions Management Consortium)

The Greenhouse Emissions Management Consortium is a Canadian association of companies with voluntary GHG emissions reduction targets. Although GEMCO does not have a group (cumulative) GHG emissions reduction target, it provides a forum for the exchange of ideas and

[40] EcoSecurities could not obtain the list of all forestry project contributors.
[41] http://nature.org/aboutus/magazine/2001/sepoct/work/art4732.html: *The Nature Conservancy*: " Seeing the Forest for the … Carbon."
[42] See brief description of this initiative above.

best Canadian/North American practices in the climate change area. Participation in GEMCO is not limited to Canadian companies. In fact, most trades occurred with the US businesses.

> GEMCO was formed in 1996 when TransAlta Corporation joined six other energy companies -- ATCO Electric, BC Gas, Enbridge Consumers Gas & Pipelines, EPCPR Utilities, Inc., Nova Scotia Power, Ontario Power Generation, Inc., Sask Power and TransCanada Pipelines Ltd.-- to develop a wide range of climate change issues solutions.[43]

In October 1999 the Association announced an agreement with the IGF Insurance Company (a US crop insurer) to buy approximately 2.8 MTCO2e from Iowa farm projects. Seven consortium members participate in this program, which will run until 2012.

Among the other well-known carbon projects initiated by GEMCO are methane reductions from landfills (Norseman Engineering[44] delivering 301,000 emissions reduction credits over a 14-year period); the agreement with Petro Source Carbon Company (Petro Source[45]) to option 600,000 metric tons of 2002 to 2012 vintage CO2e emissions reduction credits; and the November 2001 deal to buy from 1 to 3.5 MTCO2e for the period of 2002-2012.[46]

Hence, the cumulative GHG demand by GEMCO members (for 2001) was approximately 6.9 MTCO2e.[47] As GEMCO does not have an independent quantitative emissions reduction target for the first Kyoto commitment period, it is impossible to estimate GEMCO's additional demand for carbon offsets beyond the 6.9 MTCO2e. However, GEMCO is already involved in NAFTA-wide carbon credit transactions, which opens the possibility for the Consortium's participation in international Kyoto flexibility mechanisms.

5.2. BC Hydro

BC Hydro is Canada's third largest electric utility. The company has voluntarily committed to offsetting 50 percent of the increase in greenhouse gas emissions through 2010. This commitment applies to two new natural gas-fired power generation plants and translates into 5.5 million tons of greenhouse gas offsets.

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[43] http://www.gemco.org/ (an Introduction to GEMCO).

[44] Norseman Engineering (of Delta, BC – Canada) has been collecting methane from the Port Mann landfill site in Surrey, BC, and delivering the gas to the nearby Georgia-Pacific wallboard plant, since 1994. At the wallboard plant the methane is mixed with the regular "pipeline" natural gas to heat the burners that cure the wallboard.

[45] Petro Source is managed by PSCO2, L.P., which is 57.5% owned by a Petro Source Corporation affiliate and 42.8% by MCNIC Pipeline and Processing, a subsidiary of MCN Energy Group Inc. Petro Source manages and constructs CO2 pipelines to mature oil fields, where the CO2 is injected into the bedrock and sequestered thus allowing for a more easy flow of crude oil. In this process CO2 for oil recovery is collected from sources, which would otherwise vent CO2 in the atmosphere.

This transaction was announced on January 31, 2001.

[46] This deal represents an agreement between the US corporate ***eCommute*** Program, which is pilot funded by the US Congress and is overseen by the US EPA (Environmental Protection Agency). The program aims to reduce mobile emissions through telecommuting. It is being implemented with the assistance of the National Environmental Policy Institute (NEPI), a Washington, D.C.-based non-profit. NEPI is offering employers in the most traffic-congested US cities to reduce their daily commute and its affect on air quality. As of December 2001 five members of GEMCO intend to participate as credit buyers in this deal (no detailed information is available on the exact participants of this transaction). The total emissions reduction credit transfer should be equal from 1 to 3.5 MTCO2e under this deal.

[47] The number is obtained by summing up the volumes of Norseman, Iowa, Petro Source and ***ECommute*** carbon offsets.

In 2001 BC Hydro solicited a wide range of GHG emissions reduction proposals in Canada to generate a carbon offset pool for the new electricity generating activity. Being unable to receive a large number of proposals from the Canadian suppliers, on January 10, 2002 the company re-issued RFP for 5.5 MTCO2e from entities both within and outside the Canadian GHG market.[48]

The company is interested in a range of offset projects including (but not limited to) landfill gas, renewable energy, energy efficiency, fuel switching, industrial process improvements and agricultural waste management. BC Hydro hopes to acquire GHG offsets generated between 2002 and 2020.

5.3. Ontario Power Generation

OPG generates and sells electricity to customers in Ontario and interconnected electricity markets.[49] OPG was formed in 1999 from the generation business of the former Ontario Hydro, Ontario's primary power supplier for 90 years. OPG is one of the largest electricity generators in North America, with annual revenue exceeding $5.8 billion.

OPG made a commitment in 1995 to stabilize its net CO2 emissions at 26 MTCO2e[50] to support the Canadian pledge to reduce greenhouse gas emissions.

OPG plans to meet this target through aggressive steps to improve internal energy efficiencies and by purchasing carbon credits.

OPG's CO2 initiatives and achievements in 2000 include:

- Offsetting 30% of its post-2000 GHG emissions (relative to the 1990 base) by acquiring 12.5 million tons of CO2 Emission Reduction Credits, of which 2.5 million tons were generated through internal energy efficiency measures; [51]
- Commitment to lease 10 low-emission vehicles - electric, gas/electric hybrid or natural gas - each year for the next three years. In 2001, this will represent about 10% of its corporate fleet;
- Addition of 13 MW of green power to OPG's energy mix; and
- OPG has joined the Environmental Defense (ED) ***Partnership for Climate Action***.

Beyond 2000, OPG will continue to invest in GHG emissions reduction with the following targets:

- Stabilize net greenhouse gas emissions at 1990 levels in 2000 and beyond (at the aforementioned 26 MTCO2e);
- Set aggressive energy efficiency targets at generating stations;
- Increase OPG's renewable energy portfolio to 500 MW by 2005; and
- Plant 1.6 million native trees and shrubs in Ontario over 2000-2005 to offset CO2 emissions.[52]

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[48] The minimum project size is 100,000 tons over the contract term.
[49] http://www.opg.com/about/prodServe.asp
[50] http://www.opg.com/envComm/E_emissions_gas.asp
[51] http://www.opg.com/envComm/E_emissions_gas.asp
[52] http://www.opg.com/envComm/E_emissions_gas.asp

In 2000 OPG's net CO_2 emissions were 38.6 $MTCO_2e$. Until 2006 the annual GHG emissions reduction target will vary**,** and is estimated to be between 21 to 26 $MTCO_2e$. If 21 $MTCO_2e$ are taken as the annual GHG emissions reduction target for 2001-2005, then the total 2001-2005 emissions reductions target would be equal to 105 $MTCO_2e$. If 26 $MTCO_2e$ are to be emissions reduction target, then cumulative emissions reduction target is equivalent to 130 $MTCO_2e$.
OPG estimated that tree plantations will offset approximately 900,000 tons CO_2 over the lifetime of these projects.

Therefore, OPG's demand for carbon offsets may vary between 104-129 $MTCO_2e$ for 2001-2005. However, a share of this demand for carbon offsets may be met through the aforementioned GEMCO and other volunteer commitments. EcoSecurities estimates OPG's remaining demand could be approximately 100 $MTCO_2e$ over the 2002-2006 period.[53]

5.4. Suncor Energy

Suncor is an integrated Canadian energy company in Canada's oil sands industry. Suncor is also a natural gas producer in Western Canada. In addition the company operates a refining and marketing business in Ontario while pursuing an oil shale project in Australia.

In parallel to developing conventional fossil fuel resources, Suncor is investing in alternative and renewable energy for its future energy projects. In January 2000 Suncor announced its plans to invest about $100 million in the development of alternative energy sources.[54]

Suncor has committed to lowering its net greenhouse gas emissions to six percent below 1990 levels by 2010.

Suncor's 2000 emissions were 7.7 $MtCO_2e$ below their 1990 level. In other words, over the 1990-2000 period, Suncor's *annual* emissions reductions were approximately 3.0 $MTCO_2e$.[55]

> Beyond 2000, Suncor's Oil Sands (production of blended refinery feedstock and transportation fuels from oil sands) projected annual GHG emissions reduction to be within the range of six $MTCO_2e$ until 2002.[56] Sunoco, which represents Suncor's oil refinery branch, plans to reduce its own GHG emissions within the range of 100,000 $MTCO_2e$ per year in addition to the above-mentioned 6 $MTCO_2e$.

The company is interested in buying carbon offsets, but views them as one of multiple tools of GHG emissions reduction. For example, Suncor is very active in R&D related to underground carbon sequestration as well as a range of others.[57]

Suncor has partnered with a group of global energy companies to research and develop advanced carbon dioxide (CO_2) separation and geologic storage technologies aimed at reducing greenhouse

[53] The complete OPG Strategy to Manage Greenhouse Gas Emissions is available in the 1999 GHG Action Plan http://www.opg.com/envComm/E_GasRep2001.pdf, p. 10.
[54] http://www.suncor.com/bins/content_page.asp?cid=2-41-605
[55] http://www.suncor.com/SiteAdmin/data/1/rec_docs/81_Taking%20action%204%20page00.pdf, p. 3.
[56] http://www.suncor.com/SiteAdmin/data/1/rec_docs/80_Managing%20emissions%202%20pge00.pdf, p. 2. These data were reported for Suncor's Oil Sands business only (which is the major contributor of GHG emissions among all divisions of the company)
[57] http://www.suncor.com/SiteAdmin/data/1/rec_docs/81_Taking%20action%204%20page00.pdf, p. 4.

gas emissions. This initiative, known as the CO2 Capture Project (CCP) is a US$20 million, three-and-a-half-year project.[58]

Other members of the CO2 underground sequestration project include BP, Chevron, Norsk Hydro, Statoil, Shell and Texaco.

5.5. TransAlta

TransAlta is a Canadian electricity generation and marketing company with about $7 billion in assets. Its business focuses on developing coal-and gas-fired electricity generation in Canada, Mexico and the United States. [59]

TransAlta's GHG reduction goals include:

- Return GHG emissions to 1990 levels by 2000.
- Achieve zero net GHG emissions from Canadian operations by 2024.

TransAlta's reported GHG emissions for 1998-2000 are as follows:

Table 1: TransAlta's Greenhouse Gas Emissions, 1998-2000, MTCO2e

Indicator	**Units**	**1998**	**1999**	**2000**
Gross Emissions	Tons CO2e	28,884,000	29,186,000	38,424,000
Reductions (overseas carbon offsets and/or domestic projects)	Tons CO2e	3,684,000	4,266,000	6,662,000
Net Emissions	Tons CO2e	25,200,000	24,920,000	31,762,000

Source: ***TransAlta's Environmental Statistical Summary, 2000 (2000 Report on Sustainable Development).***[60]
Note: *net emissions are the result of TransAlta's reduction initiatives in Canada, Australia and the US and purchased offsets from projects worldwide.*

In its 2000 *Sustainable Report*[61] TransAlta announced that it would invest in about 2 MTCO2e of carbon offsets while investigating carbon purchase opportunities for the following years. While EcoSecurities was not able to obtain updated information on the scope of planned investment in carbon offset purchases beyond 2002, we assume this commitment constant until 2005, which would give us TransAlta's demand for carbon offsets in the volume of about 8-10 MTCO2e *at the minimum*. At the same time, one would notice that in the year 2000 TransAlta reduced its GHG emissions by 6.7 MTCO2e, which emphasizes that our estimates of TransAlta's demand for the purchase of carbon credits are hypothesized at an absolute minimum level.

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[58] http://www.suncor.com/SiteAdmin/data/1/rec_docs/80_Managing%20emissions%202%20pge00.pdf, p. 2.
[59] http://www.transalta.com/WEBSITE2001/TAWEBSITE.NSF/AllDoc/ACAC8CD45B4C9F8D872569A2007E3952?OpenDocument.
[60] http://www.transalta.com/WEBSITE2001/TASDWEBSITE.NSF/AllDoc/17CF9EFF18C968D987256A34007486AF?OpenDocument
[61] Ibid.

EcoSecurities understands that TransAlta remains interested in international emissions trading with consideration of investing in JI/CDM projects.

6. AUSTRALIA

While the Australian government has not determined the shape of domestic emissions trading, it has clearly indicated its preference for using the most economically efficient ways of meeting its first Kyoto commitment target of 108% relative to the 1990s base.[62] In connection with this approach, the Australian Greenhouse Challenge program (launched in 1995) is the world's broadest voluntary emissions reduction initiative. It targets private and public sectors, and is sponsored by the Australian government. Under this program, participating organizations sign agreements with the Government, which provide a framework for undertaking and reporting emissions abatement practices.

The Australian Government states that: "An independent evaluation of the program has demonstrated that the Challenge has been highly effective in achieving greenhouse gas emissions abatement, and in building the capacity of both Government and industry to identify, monitor, manage and report greenhouse gas emissions."[63] In particular, it was estimated that in 2000 the actions undertaken by the private end-users resulted in the estimated emissions reductions of 23.5 MtCO2e (per year), which constituted a 16% drop relative to 1995 emissions levels for the industrial entities participating in this program. . It was also assessed that in the same year electricity generators and distributors registered approximately 5 MtCO2e in annual emissions reductions, which, relative to 1995, represented a 3% reduction (for the aforementioned industrial users).

The [Australian] Challenge was successful in broadening and diversifying participation of public and private organizations from multiple industrial sectors. For example, in 2000 the Greenhouse Challenge had a 100% sectoral coverage of aluminum and cement production, a 98 % participation of oil and gas industries and 91% coverage of coal mining. Sectoral GHG emissions reduction Agreements were signed with the Australian Cement Industry Federation[64] and an Australian Aluminum Council.[65]

However, most Australia-based companies registered in the Australia Greenhouse Challenge program do not report intentions to participate in international emissions reduction mechanisms – namely, JI and/or CDM projects. This may be partially due to the specific reporting format[66], which does not permit participants to elaborate on the extent of their interest in *international* flexibility mechanisms. Hence, in analyzing specific corporate commitments, EcoSecurities reported the willingness to participate in international mechanisms only if/when the corporate interviewee has indicated so on behalf of a given corporation.

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[62] http://www.greenhouse.gov.au/emissionstrading/index.html
[63] http://www. greenhouse.gov.au/challenge/html/about/about.html
[64] Information obtained in a confidential interview.
[65] For details see: http://www.aluminium.org.au
[66] The program was active before the Kyoto Protocol was agreed upon. Therefore its reporting format does not include international flexibility mechanisms. Currently the Challenge remains a program within the broader framework of the Australian Greenhouse Office: http://www.greenhouse.gov.au/challenge/html/about/agoagreement.html

Below we focus on voluntary emissions reduction actions of the *largest selected* national energy-related and energy-intensive companies.[67] The Challenge program currently has close to 150 members, and our selection process may appear to be biased since we choose to review only 10 companies in some detail. However, our company-selection process was guided by the confidential recommendations of Australian decision-makers involved in the GHG policy process.

6.1. ACTEW Corporation

ACTEW Corporation is a formerly government-owned enterprise, which was privatized in 1995. It is now one of Australia's largest combined energy and water utilities with an annual turnover in excess of A$300 million (US$153.8 million).[68]

ACTEW joined Greenhouse Challenge Program in December 1998. Under this initiative the company is committed to:

- Reconfiguration of electricity transmission system to prevent losses; and
- Development of further mini-hydro generation schemes.

ACTEW has also committed to purchasing energy produced from methane collection at Canberra's solid waste landfill complexes from power generation projects currently installed by a third party. A small hydro-electric pilot scheme is under consideration contingent on the completion of a successful engineering study. ACTEW is also developing an emissions reduction target for vehicle usage.[69]

In the area of renewable energy use, ACTEW has committed to increase the amount of electricity generated from green sources by 50% until 2005.[70]The 2001-2005 *Environmental Management Plan* does *not* contain a specific GHG emissions reduction target characteristic to the US or/and some European companies.

ACTEW's GHG inventory in 1994-95 placed its GHG emissions at 125,558 t CO_2e. Most emissions came from electricity distribution losses that amounted to about 77% (on average). In 1997-98 ACTEW emitted 142,473 tCO_2e. The company estimated that without the Greenhouse Challenge Action Plan, by 2001 CO_2e emissions would have remained at 137,087 tCO_2e/year.

ACTEW's Greenhouse Challenge action plans were intended to lead to GHG emissions reductions in the volume of 4,835 tCO_2e /year (constituting emissions reduction of 3.5%/year). However, these goals were to be met in 2001. As noted above, no information is available for 2000-2005 emissions reduction commitment. The company estimated that in 1995-2001 it would also influence its customers' emissions reductions of around 36,505 tons CO_2e/year.

In the absence of publicly-disclosed quantified GHG emissions reduction target beyond 2001, EcoSecurities assumes that *in the short term* the company will pursue emissions reduction policy

[67] EcoSecurities chose not to review emissions reduction commitments of several Australian dairy and light industry companies due to insignificant volume of GHG emissions from their operations.

[68] Exchange rates for January 2002

[69] ACTEW ***Environmental Management Plan*** for 2001-2005, available on http://www.actew.com.au/publications/environmental/pdf/emp.pdf

[70] Ibid., p. 5.

to avoid about 4,835 tCO2e/year (see the above paragraph). No information is available on the company's plans regarding participation in JI/CDM projects.

6.2. Broken Hill Propriety (BHP Billiton)

BHP Billiton is a newly merged Australian business, which brought together the strength of two oldest Australian natural resource companies:

- Broken Hill Propriety (BHP), which is a diversified commodity suite that included minerals, oil, gas and steel. Before the merge, BHP was one of Australia's oldest and largest companies; and
- Billiton with a portfolio of mining and metals operations. [71]

Until the merge, BHP has had a per-unit of production GHG emissions reduction target, which was reported in the Australian GHG Challenge as the reduction of 5 percent over the five-year period with the base of 1995. In 1990 BHP-Billiton's GHG emissions totaled approximately 32 MTCO2e; in the middle of the 1990s these emissions spiked to 38 MTCO2e, but declined again to 27.3 MTCO2e by 2000-2001.[72]

The 2001 *Health, Safety and Environmental Community Report* provides *no* updated information on the GHG emissions reduction target beyond the year 2000. [73] The report specifies that all sites/divisions of the new company (comprised from two merged businesses) must develop greenhouse gas management programs to be in place by June 2003; the *aggregate* group target for the reduction of GHG gases must be developed by June 2003 as well.[74] This future (2003) quantified emissions reduction target will be adopted in absolute terms (not per unit of production).

6.3. CS Energy

CS Energy is an Australian power company operating three power station facilities in the state of Queensland. CS Energy is a government-owned corporation, with the Queensland Treasurer and the Minister for Mines and Energy being its major shareholders. [75]

In 1994-95, CS Energy emitted 7.4 MTCO2e at 1,010 kilogram of CO_2 per MWh sold. In 1996-97 the company emitted 7.9 MTCO2e at 990 kilograms of CO_2 per MWh sold.[76] By participating in Australian Greenhouse Challenge, CS Energy has initially committed to reducing its CO_2 emissions by 6 % by 1999-2000.[77] CS Energy emissions reduction commitment associated with

[71] http://www.bhpbilliton.com/bb/aboutUs/home.jsp

[72] http://www.bhpbilliton.com/bbContentRepository/Reports/2001HSECReport.pdf;jsessionid=AE4G1UW253PGUFH4EA0CLMQ, p. 39

[73] The report is not publicly available until the end of July 2002.

[74] http://www.bhpbilliton.com/bbContentRepository/Reports/2001HSECReport.pdf;jsessionid=TTYCPYWRRMLFEFH4EA0CLMQ, p. 18.

[75] http://www.csenergy.com.au/

[76] http://www.greenhouse.gov.au/cgi-bin/challenge/dbsearch.pl?page=agree_detail;aid=193

[77] Ibid.

the GHG Challenge effectively ended at the end of June 2001. As of January 2002 the company has not renewed their participation in the GHG Challenge program, although the company is planning to renew its emissions reduction commitment through the *Generator Efficiency Standard Program* (GES).

In September 2000, CS Energy signed on to the Australian Greenhouse Office GES[78] program. Under this program CS Energy is required to assess the emission reduction potential from its generation facilities, and to develop and implement a program of efficiency improvements aimed at maintaining the best practice for its plant. CS Energy is currently preparing a Strategic Plan on emissions reductions for the period 2001/02 to 2005/06 and it hopes to finalize and implement this plan before November 2002.

In addition to existing plant improvements, CS Energy has recently installed 900 MW (nominal) of super-critical coal fired plant at Callide in central Queensland and is presently constructing an additional 380 MW (nominal) of gas fired combined cycle plant in south east Queensland which will contribute significantly to reductions in Greenhouse gas emissions on a per MWh sent-out basis across its portfolio.[79]

In sum, as of January 2002 CS Energy has made no quantified emissions reduction commitment through the Australian Greenhouse Challenge beyond 2001. The company informed EcoSecurities that it is not considering investing in JI and/or CDM projects at this point.

6.4. Loy Yang Propriety

Loy Yang Power owns and operates the 2,000 MW Loy Yang power station and the adjacent Loy Yang coal mine in Victoria (the largest open cut coal mine in Australia). The company supplies approximately one third of the power requirements to this state. Electricity sales are also made to the neighboring states of South Australia and New South Wales. [80]

According to its Australian GHG Challenge commitment, the company originally pledged to reduce its GHG emissions by 4.26 percent by 2001 (with 1996 as base year). In this base year, the company has emitted 16.15 MTCO2e (i.e. a GHG emissions Index of 1.26 tons CO2/MWh for 1995/96).[81] .

As of January 2002, Loy Yang Propriety has not extended the above GHG commitment, but the company is researching the possibilities of upgrading its HP turbines over 2002-2005, which should result in reduction of CO2 emissions.[82] In lieu of these developments, Loy Yang is planning to extend its GHG Challenge participation in 2002 until 2004 with subsequent extension possible until 2008. Tentative emissions reduction target is estimated to be close to 2% (with 2002 possible base year).

The company has made little consideration for investing in JI or CDM, but the management recognizes the importance of these mechanisms and admits that Loy Yang's position may change when/if Australia launches the domestic trading system or/and there appear more possibilities for engaging in international emissions trading.

[78] GES stands for "Generator Efficiency Standard"
[79] Information obtained in confidential interviews.
[80] http://www.loyyangpower.com.au/site/main.html
[81] Information obtained in confidential interview.
[82] Information obtained in a confidential interview.

6.5. Australian Aluminum Council [83]

The Australian Aluminum Council Limited is an interest group that represents members of the aluminum industry in Australia. The Council's members include businesses operating in bauxite mining, alumina refining, aluminum metal production and semi-fabricated aluminum production. [84] Among the largest members of the Council are Alcoa World Alumina Australia, BHP Billiton Australia, CITIC Australia Pty., Kaiser Aluminum, Comalco Aluminum Ltd. and others.

In 1999 GHG intensity of production over all members of the Council reached 17.9 tCO_2e per ton of aluminum, to be compared with 23.4 tCO2e/ton in 1990. Based on this achievement, the Council has become a leader in GHG emission reductions in Australia.[85]

When direct (on-site) emissions are considered, GHG emissions in 1999 were 4.1 MtCO2e compared to 6.4 MtCO2e in 1990, a reduction of 37.0 percent. Indirect emissions related to electricity consumption rose by 18.4 percent over the same period.

No information is available about the Aluminum Council's *post*-2001 GHG reduction commitments, although we received indications that this organization is considering post-2001 commitments, which are scheduled for release by the end of this year (2002).

6.6. Normandy Mining

Normandy Mining is Australia's largest gold company. It is globally active in mineral exploration, mine development, mining and mineral processing. Internationally Normandy Mining is the World's seventh largest listed gold producer with operations in Australia, USA, New Zealand, Turkey, Chile, Brazil, Canada and Côte d'Ivoire.

All major Normandy-managed Australian operations are included in the Greenhouse Gas Challenge program. As a signatory to the Challenge, Normandy is required to identify its energy consumption and greenhouse gas emissions and provide estimates of baseline and forecast emissions.[86]

GHG emissions from Normandy's Australian operations in 1999-00 were reported to be 606,294 tCO2e. The company estimates that, without participation in the Challenge, these emissions would have reached 631,439 tCO2e.[87] In other words, it claims a 4 % emission reduction compared to its baseline. No definitive data were available for 2001, but preliminary emissions estimates were around 631,686 tCO2e, 4.3 % below the projected baseline.

In 2001 Normandy reported that GHG emissions savings were expected to increase in 2002-2003 as action plans at the new sites continue to be implemented. It should be noted that future group net emissions are expected to drop significantly due to closure/sale of several sites."[88]

[83] EcoSecurities was advised to research GHG emissions reduction commitments by the Australian Cement industry, but we chose to omit representing the Australian Cement Council on these pages due to the lack of public information on their pre-2001 and post 2001 commitments.
[84] http://www.aluminium.org.au
[85] http://www.greenhouse.gov.au/cgi-bin/challenge/dbsearch.pl?page=report_detail;aid=477;report_id=246
[86] http://www.normandy.com.au/social.htm
[87] http://www.normandy.com.au/PDFNormandy/N&B2000-Normandy.pdf
[88] http://www.normandy.com.au/social.htm

Normandy has also announced it would reduce its emissions by 10.9 percent; by 2004 relative to 2000 level.[89]This commitment could lead to an approximated 69,000 tCO2e of emission reduction compared to baseline by 2004.

6.7. Rio Tinto Limited[90]

Rio Tinto is engaged in finding, mining and developing various mineral resources. In Australia the company is best known for its development of coal and diamonds.[91] In addition to coal/diamond mining operations, Rio Tinto is involved in the mining of copper, aluminum and iron ore. With major facilities in Australia, the UK, United States, Argentina, Canada, South Africa, Zimbabwe, Namibia, Portugal, Spain, Sweden, Italy, New Zealand and Indonesia, Rio Tinto has achieved net earnings of US$1.5 billion for 2000.[92]

Rio Tinto's has announced it would reduce its *per unit or production* emissions by 5% in 2001 compared to 1998 level. In 2000, the Group reported a reduction of on-site emissions by 5.7 percent compared to 1998 levels, with total GHG emissions of 23 MTCO2e.[93] The goal set in the mid-90s has thus been reached, mainly through reduction of fuel use and improvements in industrial and land management processes.

After 2001 the company pledged to continue to:

- Collect GHG emissions data from every business;
- Include climate change goals to reduce company's GHG emissions in each businesses' environmental management system; and
- Ensure each Rio Tinto business unit understands the greenhouse and energy impacts of each of its products throughout their lifecycle. [94]

Rio Tinto emphasized its strong support for the emissions reduction flexibility mechanisms including joint implementation, clean development mechanisms, and emissions trading.[95]No information is available on the company's post-2001 emissions reduction target on either *per-unit* level or in absolute terms.

6.8. Wesfarmers CSBP

Wesfarmers CSBP Limited is Western Australia's largest fertilizer and industrial chemical manufacturer. The company has more than 600 employees and for the mid-1990s had an annual turnover of approximately A$400 million.[96]

[89] Normandy's Report does not clearly indicate the base year. The company has initially signed Greenhouse Challenge agreement in 1998. However, in the beginning of 2000 Normandy has renewed its Greenhouse Challenge commitment, at which time it released this environmental report. Based on this , EcoSecurities assumes the year 2000 to be the actual base year against which the commitment target was set.

[90] Rio Tinto has an additional head office in the UK, but the assets of both companies are managed on the unified basis.

[91]

[92] http://www.riotinto.com/library/reports_PDFs/2000_financial_annualReport.pdf

[93] http://www.riotinto.com/library/reports_PDFs/2000_socEnv.pdf, p. 34 (2000 ***Social and Environmental Report***).

[94] http://www.north.com.au/community/mining/Climate_Targets.asp

[95] http://www.north.com.au/community/mining/Climate_Commitment.asp

[96] It is a part of a larger Wesfarmers Group.

Based on the base year of 1995, Wesfarmers CSBP's GHG action plans aimed at reducing GHG emissions by 20 percent by the end of year 2000. In 1995 the group's GHG emissions stood at 990,000 tCO2e.[97] Total GHG emissions in 1999/2000 were less than 600,000 tCO2e, hence a 40% emission reduction compared to base year. This result comes from decreased production of ammonia, implementation of various process efficiency measures and from financing and tree plantations.

No information is available on the company's post-2000 commitment and/or on its willingness to participate in international emissions trading mechanisms.

6.9. Woodside Petroleum Ltd.

Woodside Petroleum Ltd. is one of Australia's leading hydrocarbon exploration, production and processing companies. The company is a participant in- and operator of the North West Shelf Project, where Woodside is responsible for the management of offshore and onshore assets worth A$9 billion as well as the delivery of oil/gas products for $4 billion/year. Woodside is developing a number of additional oil fields outside the North West Shelf Project.

As a result of the completion of the North West Shelf Project's LNG facilities, Woodside's emissions have increased from 2.9 MTCO2e in 1990 to 5.3 MtCO2e in 1995 and to 7.2 MtCO2e in 1996.[98] For 2000, Woodside Petroleum emissions were forecast to stand at 12 MtCO2e . At the same time Woodside expected to reduce its *total* GHG emissions (methane included) of 12 MtCO2e per year (baseline emissions) to 9 MtCO2e per year, which would represent a savings of 25 percent.[99]

Examples of Woodside's measures aimed at implementing GHG reduction programs include:

- Incorporation of gas re-injection technology on several floating oil fields expected to save approximately 12 MTCO2e over project life; [100]

- The design of new processing equipment on the North West Shelf that enabled the company to design an LNG processing train with a Greenhouse efficiency of 0.32 tCO2 of CO2e per ton of LNG - an improvement of 48% over conventional LNG train designs;

- Woodside Petroleum helped to set up a new company, *Ecocarbon*, to develop a computer-based emissions trading pilot scheme; to provide a forum for international experts on emissions trading; and to publicize industry concerns about GHG emissions trading;

- Woodside has further created *Metasource*[101] – a renewable energy company, which is developing a range of GHG-reduction services for energy businesses in addition to developing renewable energy power stations. The first bio-fuel power station (5 MW) came under consideration in May 2001.

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[97] http://www.wesfarmers.com.au/investor_relations/pdfs/WFER9900.pdf, p. 29.
[98] http://www.greenhouse.gov.au/cgi-bin/challenge/dbsearch.pl?page=agree_detail;aid=351
[99] Ibid
[100] http://www.greenhouse.gov.au/cgi-bin/challenge/dbsearch.pl?page=agree_detail;aid=351
[101] http://www.metasource.com.au/business/greenhouse.html

To reduce its emissions further, the company is investigating options for re-injection of CO_2 from the North West Shelf. However, the large distances to suitable reservoirs and additional emissions from re-injection compression affect environmental viability of such projects.

As mentioned above, through its subsidiary *Metasource*, Woodside Petroleum is rapidly becoming well positioned for participating in international emissions trading deals

7. JAPAN

In mid-January 2002 the Japanese government stated that it would step back from the attempt to introduce mandatory GHG emissions reduction targets in favor of voluntary actions by Japanese industries. As a result, the Japanese industry, responsible for 40% of national GHG emissions, will be asked to devise its own methods to control the amount of GHG emitted during the first phase of emissions reductions, from 2002 to 2004. In lieu of this development, EcoSecurities estimates that voluntary GHG emissions reduction commitments adopted by the largest Japanese corporations are likely to be supplemented across the multiplicity of economic sectors.

EcoSecurities chose to focus on Sony's voluntary program, which we consider one of the most comprehensive examples of corporate programs so far. We stress, however, that a lot of new commitments should be made after January 2002 in conjunction to the government program described in the main section of our Report.

7.1. Sony

Sony's CO2 emissions resulting from the direct use of energy were estimated at 1.7 MTCO2e (2000). The company is pursuing energy-saving activities and developing fuels switching strategies (increasing the use of green power) among other means of reducing its GHG emissions.

However; Sony believes, the greatest volume of GHG emissions is generated by Sony customers consuming electricity while operating Sony products. For example, carbon dioxide emissions generated over the whole lifetime of the products shipped during FY2000, were estimated to reach approximately 8.1 MTCO2e. Sony is responding with efforts to reduce product power consumption and minimize resultant CO2 emissions through improved product design and the introduction of new types of products and services.[102]

In 2000 SONY accepted an emissions reduction target of 15% relative to the year 2000 by 2005. This target applies to Sony manufacturing sites, while the company has also volunteered emissions reduction targets in the spheres of transportation, logistics and product use:

[102] http://www.sony.co.jp/SonyInfo/Environment/pdf/envrepo2001-e.pdf

Table 2. Greenhouse Gas Emissions Reduction Obligations, Sony Corporation 2000:

Production Division	Obligation
Sites	Reduce CO2 emissions per sales unit by 15% or more compared with FY2000 by FY2005 year-end.
Carbon Offset Contribution	Aim to increase the ratio of renewable resources to 5% or more of all energy consumed at each site (Renewable energy, etc.) by FY2005 year-end.
Site-Owned Vehicles	Reduce CO2 emissions per sales unit by 20% or more compared with FY2000 by FY2005 year-end.
Logistics	Reduce CO2 emissions per sales unit by 15% or more within the Sony Group compared with FY2001 by FY2005 year-end.
Products	Reduce power consumption by sites by 30% compared with FY2000 by FY2005 year-end.

Source: http://www.sony.co.jp/SonyInfo/Environment/pdf/envrepo2001-e.pdf, *p. 19*

8. FINLAND

The Finnish industry has adopted a self-commitment for the reduction of CO2 emissions, where Finnish companies do not take individual voluntary emissions reduction targets, but (similar to Germany) become a party to sectoral GHG emissions reduction Agreements.

In this report, we focus on Fortum Oyj, which is one of the largest European utilities and is already an active participant in international GHG reduction regime.

8.1. Fortum Oyj

Fortum Oyj is a Finnish electricity-generation company, which is also involved in various services in the areas of design, building, refurbishment and operation and maintenance services for the energy sector.[103] Fortum is well-known world wide for its initiatives in expanding biofuels-based power production and for producing environmentally benign transportation fuel. In 2000 Fortum net sales totaled EUR 11,026 million.[104]

In February 2000, Fortum Oyj published a *Climate Initiative*, which comprises its short- and long-term targets for reducing CO_2 emissions. The Initiative outlined immediate emissions reduction measures, targets for 2005 as well as objectives covering corporate development up to 2010.

Among others the plan includes:

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[103] http://www.fortum.com/channel.asp?path=1;539;8763
[104] http://www.fortum.com/document.asp?path=1;539;542;562;913

- Creation of a company Climate Fund (see below) to facilitate early implementation of JI/CDM projects;

- Special climate assessment and CO_2 management plan for all investment projects; and

- Focusing research, development and commercialization of technologies on climate-benign concepts.

Fortum Climate Fund was set up in 2000 to acquire GHG emission reductions at a reasonable price by participating in JI and/or CDM projects or by contributing to ends that develop and implement such projects. The Fund has to also develop Fortum's competence with respect to the Kyoto mechanisms to prepare the company to operate in the developing markets for greenhouse gas emission trading.

The initial capital of the Fund is EUR1.6 million. The Fund's first investment was to join the World Bank Prototype Carbon Fund.

The Fund is also exploring possibilities for developing bilateral emissions reduction projects in developing countries and economies in transition (EITs). Two of these projects have been preliminarily accepted for further groundwork both in the Climate Fund and in the pilot project financed by the Finnish State under the Kyoto mechanisms.[105]

In November 2000 Fortum had already participated in a North America-European GHG trade when Fortum and the Canadian energy company EPCOR Utilities Inc. signed the contract on the trade of CO2 emissions, in which Fortum sold EPCOR Utilities Inc. a 50,000 tCO2e emission reduction.[106]

In addition to Carbon Fund activity, in implementing its GHG reduction strategy Fortum is heavily relying on utilizing renewable energy resources. Fortum's post- 2000 aim is to reduce carbon dioxide emissions of its operations in Finland by 300,000-500,000 tons annually through increased use of biofuels in energy production. [107]

The action plan for 2005 (as compared to 1999 levels) includes the following steps:

- Increased use of biofuels in heat & power production by 50 %, resulting in a reduction of Fortum's annual CO_2 emission in Finland by up to 500.000 tCO2e;

- Launching introduction of a bio-component in traffic fuels used by the company and use of liquid biofuel for heating;

- Tripling of Fortum's wind power production to 18 GWh/year; and

- Continuous increase in the number of 'climate benign' products and services (as appreciated by customers and markets).[108]

Fortum has also developed emissions reduction objectives and targets for 2010 that include (but are not limited to):

- Increase of CHP production and intensified utilization of renewable energy sources;

[105] http://www.fortum.com/document.asp?path=1;539;6248;6256;6259;6884;6885;6924;8539;8540
[106] http://www.fortum.com/document.asp?path=1;539;6248;6256;6259;6884;6885;6924;8539;8542
[107] http://www.fortum.com/document.asp?path=1;539;6248;6256;6259;6884;6885;6924;8539
[108] http://www.fortum.com/document.asp?path=1;539;6248;6256;6854;6867;6870;7200

- Continuing development of nuclear power;
- Development and *commercialization* of climate-benign technologies; and
- *Optimal use of the Kyoto mechanisms*.[109]

Fortum's 2000 emissions were 8.96 MtCO2e[110]. According to the *Climate Initiative* plan Fortum should reduce its emissions compared to baseline by an additional 500,000 tCO2e per year until 2005, reaching 2.5 MtCO2e below base year in 2005. Although the plan states that most of these reductions are to be secured through the increased use of biofuels, in case the company falls short of its biofuel use target, any share of 2.5 MTCO2e could be, theoretically, purchased through the JI or/and CDM mechanisms. Fortum's 2000 Report[111] does not specify any *direct* quantified GHG emissions reduction target.

9. NORWAY

The core of Norwegian GHG policy is a carbon tax, which is to be marginally increased in 2002. Norwegian government is planning to continue taxing carbon dioxide until a national quota system is introduced. However, as Norwegian industry increasingly insists on its preference for voluntary GHG emissions reduction targets and emissions, Norwegian industrial federations continue to negotiate voluntary emissions reduction policies and targets.

In 2001 the Norwegian Ministry of the Environment and the Norwegian aluminum industry reached an agreement on emission reduction in this sector.[112] This Agreement, which aims at reducing energy consumption from electrolysis, is now a component of Norway's national climate policy.

The Agreement requires the aluminum industry to cut CO2e emissions from electrolysis by 55% by the end of 2005, relative to 1990 base levels. GHG emissions from the electrolysis process used by the Norwegian aluminum industry in 1990 totaled 5.5 tons of CO2e per ton of aluminum produced. Hence, the agreement requires emissions reduction to the level of 3 tCO2e per ton of aluminum.

The Agreement also states that the aluminum industry should provide an annual report to the Norwegian *Pollution Control Authority* detailing their GHG emissions and aluminum production for the year. The first report by the industry was submitted on 1 March 1998. No detailed data are available on the total volume of emissions reduction commitment by aluminum industry.

9.1. Elkem

Elkem is one of the leading world producers of metals and materials. Elkem's main products are ferroalloys, silicon metal, aluminum, carbon and microsilica. The Group is one of Norway's largest industrial entities.[113] In the last quarter of 2001 Elkem's net sales reached $9.7 million.[114]

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[109] http://www.fortum.com/document.asp?path=1;539;6248;6256;6259;6884;6885;6924;8539;6935
[110] http://www.fortum.com/document.asp?path=1;539;6248;6256;6259;6884;6886;7096
[111] http://www.fortum.com/gallery/vuosikertomus/AnnualReport2000.PDF
[112] http://bluetongue.ethree.com.au/climate/
[113] http://www.elkem.com
[114] http://www.elkem.com

Total greenhouse gas emissions by Elkem in Norway in 2000 were lower than 10 years ago despite an increase in metals production.[115] Under the umbrella of the above agreement with Norwegian aluminum industry, Elkem has agreed to reduce emissions by 55% per every ton of aluminum produced by 2005 (relative to 1990 levels).[116] EcoSecurities was not able to obtain information on the total volume of Elkem's GHG emissions in the base year.

Through the [Norwegian] Ferroalloy Industry 's Research Association (FFF), in 2000 Elkem continued developing bio-carbons for smelting reduction processes. The results of this research indicate that harnessing the large amount of energy in flue gases from the smelting plants could make a significant contribution to reducing GHG global emissions. [117]

10. SWITZERLAND

10.1. ST Microelectronics[118]

The company is one of the largest semiconductor companies. In 2000, ST's revenues reached $7,813.2 million for net earnings of $1,452.1 million. ST Microelectronics is the sixth largest semiconductor company in the world.[119]

ST Microelectronics' climate change goal is to become carbon dioxide neutral by 2010. In order to achieve this objective, the company plans to reduce its total energy consumption by unit of value added by at least 5% per year.[120] The company has developed an energy roadmap for reducing CO2 emissions and estimates that overall CO2 savings of 11 million tons can be achieved during the period 1994-2010. Based on their energy roadmap, they estimate that conventional energy will account only for 29% of their total energy demand in 2010. Most of suggested emissions reductions appear to be projected through in-house actions.

ST Microelectronics is also involved in international emissions trading: the company announced a carbon-offsetting forestation initiative in the United States in January 2002, which is worth $2.5 million.[121] Forestry-related carbon sequestration approach appears to be winning more and more of the attention of St Microelectronics.

In Europe ST leads the European task force of the *World Semiconductor Council* (WSC). The Council has adopted a target to reduce the aggregate PFC (Perfluorinated compounds) emissions from the industry to 10% below 1995 levels, by 2010. Twenty-four companies have signed a Memorandum of Agreement to share technical information pertaining to the reduction of PFCs

[115]http://www.elkem.com/elkem/OSL008.nsf/allbyid/c7f7654c86d8d7dac1256a4c002bd351/$file/environmentalreport.pdf

[116] EcoSecurities was not able to obtain information on Elkem's GHG emissions volumes in 1990.

[117]http://www.elkem.com/elkem/OSL008.nsf/allbyid/c7f7654c86d8d7dac1256a4c002bd351/$file/environmentalreport.pdf

[118] The company is a member of the Chicago Climate Exchange

[119] http://us.st.com/stonline/company/index.htm

[120] http://us.st.com/stonline/index.shtml (this is a Swiss company , although a member of the CCX).

[121] See the Wall Street Journal, January 23, 2002: "ST Finds Secret to Being Green: Stay in Black" (by Kevin J. Delaney).

emissions and to report results and progress according to the emissions inventorying standards developed by the Intergovernmental Panel for Climate Change (IPCC).[122]

11. GERMANY

11.1. An Umbrella Agreement between German Industry and the Federal Government:

In September 2000 the Federation of German Industries[123] and the German government concluded an agreement related to industry-wide steps for the reduction of greenhouse gas emissions. In the mid-1990s German Business concurred with the governmental objective to reduce carbon dioxide emissions and/or energy consumption by 25% in the year 2005 relative to the 1990 base. German industry also aimed at reducing emissions of the six "Kyoto gases" by 21% over period 2008-2012 (the 21% reduction also represents a national GHG reduction commitment)[124].

In 2000 the above commitment was increased to the total of 35% emissions reduction for all greenhouse gases and 28% reduction of CO2 emissions specifically by the year 2012 against the 1990 base.[125] The increase in commitment was due to warnings indicating that estimation of the late 1990s GHG emissions showed only 15%-17% reduction of CO2 discharges (instead of projected 25% CO2 emissions reduction), falling 8%-10% short of the pre-2000 commitment. This suggested that measures contained in the previous governmental policies were way short of the mark.[126] At the same time, all six Kyoto gases were reduced by around 18.5% (closer to the national target of 21%).
In 1996, "Declaration by German Industry on Global Warming", nineteen leading industry organizations and trade associations promised to reduce process-specific and induced CO2 emissions by 20% by 2005. In 2000 the German government recognized that German industry achieved a 23% reduction of such emissions – i.e., above of the volunteered target.

Post-2000, the Government has achieved an agreement with the signatories of the original pact that German industry is to aim at a 28% reduction in specific CO2 emissions by 2005, and a 35% reduction of all Kyoto GHG. This agreement, described in the post 2000 German National Climate Protection Program[127] assumes that German business would be able to reduce its emissions by an *additional* 10 MTCO2 by 2005 and by a further 10 MTCO2e by 2012 relative to the previous (1995-97) commitments. The 2000 agreement guarantees business that the federal government will ***not*** take any initiative to achieve the climate protection targets through command and control measures. Total industrial GHG emissions reductions are expected to reach 20-25 MTCO2e by 2005.[128]

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[122] http://us.st.com/stonline/index.shtml
[123] The Federation encompasses a large number of industrial organizations, where 19 industrial associations are directly responsible for the implementation of the climate change agreement.
[124] http://www.climnet.org/EUenergy/implementation/MSdocs/GermCCprogram.pdf, p. 3.
[125] Source: ***Agreement on Climate Protection between the Government of the Federal Republic of Germany and German Business,*** p.p. 2-3.
[126] http://www.climnet.org/EUenergy/implementation/MSdocs/GermCCprogram.pdf
[127] http://www.climnet.org/EUenergy/implementation/MSdocs/GermCCprogram.pdf, p. 8:"Declaration by the German Industry on Climate Protection".
[128] While transportation is set to reduce 15-20 MTCO2 and residential sector – 18-25 MTCO2e.

Under the terms of this agreement, the Federal government and German business will be jointly deciding on the realization of flexible instruments (emissions trading). Moreover, the Federal Government, represented by the Federal Ministry of Economics and the Federal Ministry for the Environment, will continue to contribute 50 percent toward financing climate protection monitoring, while German business will contribute the remaining 50 percent of program financing.

Within the umbrella-organization of German Businesses there are a number of individual industrial associations, which have taken upon themselves GHG emissions reduction targets, which may ***accede*** their portion under the German Business-Federal Government agreement. [129] However, the agreement between the Federal Government and German business presupposes that individual industrial targets will be checked against the ‘umbrella’ emissions-reduction target and such individual targets will be adjusted to correspond to the general commitment of the German Business.

11.2. BASF and VCI (German Chemical Industry) GHG Commitment

BASF is a Germany-headquartered transnational chemical company manufacturing chemicals, plastics, colorants and pigments, dispersions, automotive and industrial coatings, agricultural products and fine chemicals. The company is also involved in the production of crude oil and natural gas.[130] With 90,000 employees world wide, in 2001 BASF’s sales reached $34 billion.

BASF’s data on greenhouse gas emissions reported for 2000 are as follows:

Table 3. BASF’s GHG Emissions, 2000 (in MTCO2e)

Source: BASF Environmental Report, 2000[131]

The company’s GHG reduction goal was to cut CO2 emissions from its largest German plant from 4.7 million tons to 3.6 million tons by 2000. BASF has been developing its GHG emissions

[129] At the same time, a number of critical assessments of Germany’s voluntary sector agreements state that a number of sectors have failed to state any concrete sector-level reduction target at all. See: http://www.diw-berlin.de/english/publikationen/bulletin/docs/eb95-05/3_report.html, Kohlhaas, M. et.al: “German Industry's Voluntary Commitment to Reduce CO_2 Emissions - No Substitute for an Active Policy Against Climate Change”.
[130] http://www.basf.com/
[131] http://www.basf.de/en/corporate/environment/ub00/

policies in complete congruence with the voluntary program of the *German Chemical Industry Association* (VCI).[132]

In 1996 VCI's GHG emissions reductions target was set at 30% by the year 2000 relative to 1990 base. The overall level of VCI members' GHG emissions in 1990 was at 67.8 MTCO2e, which translated to the emissions reduction obligation of 20.3 MTCO2e by 2000. [133]

In its 2000 report, VCI announced that beyond 2000 CO2 emissions are to be reduced by an additional 28 percent by 2005 while the emissions of 'six Kyoto gases' are to be reduced by 35 percent by 2012, the end of the first commitment period.[134] VCI has agreed to this goal in exchange for the aforementioned promise from the federal government not to impose command-and-control measures, withdraw compulsory energy audits and maintain an on-going negotiation with respect to the overall system of German eco-taxes.

Given the above, individual emissions reduction commitments of VCI members are not reported independently from the Association's goals elucidated above. Hence, BASF is assumed to have a CO2 emissions reduction goal of 28 percent by 2005, which would give us an emissions reduction target of 2.1 MTCO2e by 2005.

In 2001 BASF continued to report substantial progress in reducing GHG emissions in a variety of its operations. For example, since 1990 CO2 emissions at the Münster BASF's coating plant were reduced by 50%. [135] To further reduce CO2 emissions, the company continues to examine existing production processes. This involves analyzing the material flows for each process, identifying waste generation routines and drawing up solutions to minimize residues and emissions.

BASF's R&D has also developed a method of utilizing carbon dioxide (CO_2) emitted from its operations as a foaming agent for extruded rigid foam boards instead of partially halogenated chlorofluorocarbons (HCFCs). In Ludwigshafen, Germany, 87 percent of this insulating board is now manufactured using CO2. This approach has reduced HCFC emissions by 80 percent compared with 1996 levels.

In conclusion on BASF, we emphasize that BASF is not likely to engage in the EU-wide emissions trading or/and international emissions trading projects without the support from the Association (VCI). At the same time, while supporting all Kyoto flexibility mechanisms ***in*** *principle*, VCI *has rejected* the EU draft on emissions trading stating that its disagreement with the EU Commission's decision to link emissions trading to energy-intensive industries only.[136] Therefore, at this juncture, we cannot estimate BASF's degree of involvement in international emissions trading mechanisms.

[132] Verband der Chemischen Industrie e. V. (the German chemical industry association) represents the interests of 1,400 German chemical companies and German subsidiaries of foreign enterprises in contacts with politicians, public authorities, other industries and other interest groups. VCI represents over 90% of the entire German chemical industry.
[133] http://www.dic.co.jp/eng/rd/tech/rc0302/fig02.html. The commitment was developed under the 1996 (pre-Kyoto) ***Responsible Care Program.***
[134] http://213.83.6.154/Download/67654/RespCare.pdf (update of the *Responsible Care Report*, 2000 – published by VCI).
[135] http://www.basf.de/en/news/presse/P+COAT0712.htm
[136] http://213.83.6.154/Download/67654/RespCare.pdf, p. 38.

11.3. E.ON

E.ON Energie is Germany's third-largest industrial company and the second-largest private-sector energy service provider in the world. E.ON's energy subsidiaries supply the German and European markets with electricity, district heating, gas, water and mineral oil.[137] As of January 2002 E.ON employed around 190,000 specialists
Together with other German companies, E.ON Energie has taken a voluntary agreement to reduce its CO2 emissions specifically and absolutely by 28%-30 % relative to the sectoral emissions in 1998 (where 28%-30% represent the *sectoral* target congruent to the national industrial emissions reduction target described above). This sector-specific target translates into the company-wide goal of emissions reduction of approximately 5 MTCO2e until 2010 (with 1998 as base year).

In 1998 the company-wide CO2 emissions reached approximately 50 MTCO2e, [138]

12. FRANCE

In early January 2001, the French Government met with representatives from 18 large energy-intensive or energy producing firms to discuss the possibility of setting up a program of voluntary agreements in order to achieve "significant" cuts in carbon dioxide (CO2) emissions.

France is a relative latecomer to the discussion on voluntary GHG emissions reductions targets because in 2000-2001 the French government had developed a climate change plan articulated around an energy tax (along with other type of measures). This proposal was dropped from the political agenda in the Fall 2001 and the main focus is now on other types of instruments, including voluntary agreements.[139]

The negotiations between the French industry and governmental representatives are expected to run until the end of February. At this stage voluntary agreements could be decided for period 2002 - 2004, after which they will be adapted to ensure compatibility with the EU-wide emissions trading regime.

Agreements will be based on companies/sectors committing to measurable and independently verifiable GHG emission cuts. The government is considering development of a "proportionate" sanction scheme designed to fine entities that fail to meet their emission reduction obligations.[140]

All remaining details have yet to be decided. As of January 2002 a total of 18 companies had been identified. Considered together, their joint emissions account for more than two-thirds of France's total industry and energy-related CO2 emissions.

[137] http://www.eon-energie.de/
[138] All information on E.ON obtained from confidential interviews.
[139] An energy tax proposal developed by former Environment Minister Dominique Voynet was due to take effect in January before being ruled unconstitutional in the Fall 2001.
Mr Cochet's attempts to redraft the emissions tax proposal have been unsuccessful. He continues to stress that there remains a possibility of France introducing a limited climate change tax that would supplement voluntary agreements.
[140] Ibid.

12.1. Lafarge

Lafarge is involved in production of cement, aggregates & concrete, roofing and gypsum. In 2000, the Lafarge Group reported sales of €12.2 billion (approximately $12 billion). The company operates in 75 nations with 85,000 employees. [141]

Table 4: Lafarge GHG Emissions 1990-2000 (MTCO2e):

Lafarge CO2 Emissions	**1990**	**1999**	**2000**	**% change to 1990**	**2010 Commitment**	**% change to 1990**
World-wide total						
Cement MT/yr	61	71	70	14%	-	-
CO2 MT/yr	45	45	45	0%	-	-
CO2kg/t cement	746	639	651	-13%	590	**-20%**
Industrialized Countries						
Cement MT/yr	46	47	45	-2%	50	10%
CO2 MT/yr	34	30	29	-15%	29	**-15%**
CO2kg/t cement	738	637	644	-13%	570	-23%
Developing Countries						
Cement MT/yr	15	24	25	63%	-	-
CO2 MT/yr	12	16	17	41%	-	-
CO2kg/t cement	769	642	665	-13%	620	-20%

Source: ***Lafarge Environmental Report, Section 5: "Climate Change", p. 43.*** [142]

Through WWF/Lafarge Conservation Partnership the company announced a GHG emissions reduction target of 20 percent per ton of cement produced worldwide over the period 1990-2000.[143] This corresponds to a 15 percent reduction of total emissions in Lafarge operations within Annex B. In other words, Lafarge CO2 emissions in 1990 were 45 MTCO2e and it has committed to be by 6.7 MTCO2e below this base in 2010.[144]

This commitment will be achieved by intensifying a series of actions Lafarge has been undertaking since the late 1980s. Namely, Lafarge will focus on improving energy efficiency; using waste fuels and incorporating cementitious additions, such as steel slags and fly ash from coal-fired power stations. In the future, WWF and Lafarge will look into ways of increasing the use of renewable energy (wind, solar, biomass, etc.) in Lafarge's global operations.

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[141] http://www.lafarge.com

[142] http://www.lafarge.com/lafarge/lafargeV2.nsf/html/USEA3D1DA00D12B0BAC1256AED002C357D/$file/devdurenv5US.pdf

[143] http://www.panda.org/news/press/news.cfm?id=2572

[144] However, Lafarge calculated its CO2 emissions reduction target considering alternative fuels as CO2-neutral. The reason for that is that Lafarge uses industrial wastes, including fossil fuel wastes, as sources of fuel. At the same time, World Widelife Fund (WWF), being Lafarge's climate change partner, does ***not*** discount the CO2 emitted from fossil fuel based waste fuel. Hence, according to WWF, Lafarge actual emissions reduction target is set at 10% for industrial countries in total tons of CO2 emitted. This target would yield the total emissions reduction credit demand (by Lafarge) equal to 4.5 MTCO2e.

Lafarge is ready to switch to renewable energy provided that such action can be done economically. Since energy costs account for 20 or 30 percent of total production costs, the company can shift to renewable energy only when it becomes economically competitive.

13. UNITED KINGDOM

Voluntary emissions reduction obligations are semi-institutionalized in the UK emissions reduction system as a large number of British companies are subject to company-wide or project-specific emissions reduction obligations, which permit them to qualify for participation in the national emissions trading system.

At the same time, British energy-intensive companies can negotiate reduction of the national climate change levy in exchange for achieving a certain percentage of emissions reduction where these industries are *not* required to participate in national emissions trading. Similar to Germany, Norway, Sweden and Finland, such agreements are carried out at sectoral level.[145] EcoSecurities has identified 43 sectoral agreements that were concluded after the passage of the climate change levy law.[146]

Within such agreements, each sector sets up an energy efficiency/CHP target and records/reports two-year milestones on the way to achieving targets. Thus, it is important to stress that for the companies falling into sector-specific agreements, independent GHG emissions reduction targets cannot be set in the same way as individual companies in other countries that have set their own targets. We illustrate the form of energy efficiency targets adopted by this sector on the example of *UK Coal*.

Energy-intensive companies participating in the above-mentioned sectoral Agreements cannot bid for the emissions trading incentive as they are already benefiting from the reduced climate levy rate. However, these companies will be able to bid for the financial incentive for any emissions not covered by respective sectoral Agreements (i.e., *additional* emissions reductions).

The companies not covered by sectoral agreements can become either *direct participants* (the second group of emissions trading participants) of the UK emissions trading program or its *project participants* (the third group of emissions trading participants). The government provides financial incentive for these companies to enter the national emissions trading system. The level of the incentive was set at £30 m per annum.[147]

A *direct participant* adopts a voluntary emissions reduction cap, but remains outside of the climate change levy requirement. In this case, a company's emissions reduction target

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[145] See: http://www.defra.gov.uk: "NA 00-13: ***Climate Change Levy, Public Law***": "The Finance Bill 2000 will provide for the imposition of the Climate Change Levy and for its reduction where high-energy users enter into Climate Change Levy Agreements ('CCLAs'). CCLAs are described in the draft Finance Bill as agreements which are expressed to be entered into for the purposes of the reduced rate of climate change levy. CCLAs will be required to contain certain other terms. The purpose of the CCLAs is to
provide the mechanism by which the tax reduction will be given effect..."

[146] For detailed list of sectoral agreements see http://www.defra.gov.uk/environment/ccl/pdf/etsu-analysis.pdf

[147] DETR, November 2000. "*A Greenhouse Gas Emissions Trading Scheme for the United Kingdom: Consultation Document*", p. 17.

encompasses all of its operations within a given sector. However, if company's activities transcend several economic sectors, partial emissions reduction schemes similar to project-specific activities are acceptable. Direct participants constitute the bulk of the UK GHG emissions trading system where they receive annual allocations of allowances matching their target emissions levels for each calendar year. [148]

Project-participants do not volunteer quantitative emissions reduction targets (emissions caps) covering all aspects of company's operations, but instead reduce a limited volume of emissions restricted to specific projects relative to the overall corporate baseline. The UK government encourages project-specific participation since it allows generation of *additional* carbon credits to be sold into the market. Credits from international projects (JI and/or CDM) can be used under the *project participant* scheme in the UK emissions trading market. Within the UK market the government especially encourages emissions reduction projects in areas *not* covered by the emissions trading scheme, such as transportation, services and household energy efficiency. [149]

In sum, voluntary corporate commitments in the United Kingdom are contingent upon which cluster of emissions trading groups a given company is attributed to. In the brief description of the UK voluntary actions we present examples of companies falling into all three groups, but do not attempt a comprehensive review of voluntary commitments as that is beyond the scope of this study.

This semi-institutionalization of voluntary emissions reduction initiative started in the UK with the creation of "*Make a Corporate Commitment*" (MACC2) program. The program was created to bring individual corporate practices in line with the governmental greenhouse gas reduction commitment. [150] Under this program, firms are encouraged to improve the use of their energy resources. Most of these commitments have been originally made outside of the aforementioned sectoral Agreements.

Voluntary GHG reduction targets constitute only a fraction of MACC2 areas of activity, but most program participants have accepted CO2 emissions reduction goals. Below is a review of commitments of several MACC2 members, including Land Securities Corp., BAA Plc., the Boots Company, ICI, Marks & Spenser and the UK Coal.

These entities for made available the largest amount of information on commitments. As noted in the introduction, we have omitted here the analysis of *BP*'s internal trading and GHG emissions reduction commitments since these have been widely scrutinized in multiple other sources. A number of large UK businesses participating in MACC2 – most notably, *British Airways*[151] – have become very active in GHG reduction policy-making, but we chose not to review their

148 This approach corresponds to 'cap and trade' system. In comparison, companies entering the trading through the climate change levy (if they chose to participate in trading) will be starting with the 'baseline and credit' approach, where such firms can trade only credits that they generate when they perform above their baseline emissions target. This scheme will not operate until the end of the first (internal) commitment period because the firm's true credit can be measured only at the end of compliance period.

149 Internal UK projects should prove that they are additional to the project baseline and should demonstrate confirmation of project monitoring and verification. In that sense they are highly similar to the requirements for JI and CDM projects. To facilitate the implementation of some project-specific activities, the UK government is currently discussing production of an interim list of projects with pre-agreed baselines. The government especially encourages projects in emissions reduction versus carbon sequestration because of the complexities and uncertainties of forestry projects.

150 http://www.macc2.org.uk/whatis/index.htm

151 www.britishairways.com/responsibility

activities and commitments because *British Airways* did not adopt/report a quantified emissions reduction target.[152]

13.1. Land Securities

Land Securities is one of the largest UK real estate companies. The company is managing a portfolio of properties worth approximately £8 billion and focuses on offices/premises in Central London.[153]

On September 7, 2001 Land Securities signed up with MACC2, declaring that it would reduce average emissions of CO_2 from the company's properties by 10% by 2010.[154] This commitment was made relative to the 1999-2000 baseline.

However, it is important to stress that Land Securities' obligation is to reduce CO_2 emissions in kilograms per square foot of facilities the company manages. Therefore, the conventional use of the term 'base year emissions' would not be applicable to Land Securities since the aggregate space managed by the company varies substantially from year to year.[155]

The company revealed that *if* the area of Land Securities' portfolio were to be exactly the same in 2010 as they were in 1999-2000, the company's emissions reduction target would stand 4.64 tCO_2e .[156] However, such assumption is very crude since it is highly unlikely that the overall property portfolio will remain unchanged.

Land Securities is currently reviewing the UK emissions trading system in the attempt to find out whether it should volunteer a *binding* emissions reduction target that would permit the company to participate in the UK emissions trading. Land Securities expressed its readiness to accept such a target contingent on non-prohibitive costs of emissions reduction monitoring and verification. If Land Securities agrees to a cap, it would fall into the domain of *direct participants* of the national emissions trading system.

13.2. BAA

BAA is the owner of seven UK airports, including the world's busiest international airport, Heathrow. In addition BAA has management contracts or stakes in nine airports outside the UK, plus retail management contracts at two airports in the USA.[157]

In the area of GHG emissions reduction, BAA has set a ten-year (2000-2010) objective of reducing CO_2 (absolute) emissions by 5% by March 2010 relative to the 1990 base year. This would be equivalent to a 60% reduction per passenger and a savings of approximately 110,000 tCO_2e out of the company's forecast emissions by 2010.

[152] We also chose not to focus on the well-known emissions reduction pledge by BP (British Petroleum) since BP's emissions reduction target and internal trading exercises have been extensively scrutinized in other reports/announcements.
[153] http://www.landsecurities.co.uk/pages/index_flash.htm
[154]http://www.landsecurities.co.uk/pages/masterframeset.asp?top=top_frame.asp&middle=b6_middle.asp&bottom=menu_b.asp
[155] This clarification was obtained directly from Land Securities.
[156] The base year's GHG emissions for all managed properties stood at 46, 380 tCO_2e.
[157] http://www.baa.co.uk/

In 2001 the company reported that:

> *"Performance in the first full year (2000/01) against this ten-year objective is felt to be extremely promising. Most individual airports have achieved emissions impacts below the annual milestone targets, which have been set internally and overall, as an airports group, performance is 3.7% within target. CFC holdings have been greatly reduced as a decommissioned major CFC refrigerant plant has been replaced. CFC contents are progressively being sent for incineration. HFC has been the principle replacement material due to engineering constraints, but BAA is establishing methodologies for examining alternative refrigerant materials."*[158]

BAA has further stated that was in principle favorable to flexibility mechanisms.

13.3. The Boots (Boots the Chemist) Company

The company specializes in well-being products – health and beauty related treatments. *Boots The Chemist* has been the UK market leader in healthcare, cosmetics, toiletries, baby consumables, films and film processing.[159]

> "*As a signatory to the UK government's first Making a Corporate Commitment Initiative (MACC2) in 1996, we have extended our involvement through the recently re-launched scheme by agreeing to target a further 10% … reduction in carbon dioxide emissions over the next five years.*" (2001-2005)[160]

According to Boots' 2000 Environmental Report, the total volume of CO2 emissions for year 2000 was approximately 272,000 tCO2e (other gases are not significantly present in the company's operations).[161] This would make Boots' GHG reduction commitment equal to 27,200 tCO2e until 2005.

13.4. ICI-UK (Imperial Chemical Industries)

The ICI group is a producer of specialty products and paints with about 50,000 products and over 200 manufacturing sites/offices in 55 countries. The company manufactures industrial adhesives, specialty starch, fragrances, flavors, food ingredients, specialty process intermediates, paints and refrigerants.[162]

In 2001 the ICI reported the following GHG emissions reduction commitments:

- 2.5% of GHG emissions reduction achieved in 2001 relative to 2000 emissions;
- ICI adopted 2000 as the base year for all subsequent emissions;
- The volume of emissions in 2000 (base year) was equal to 6.7 MTCO2e;[163]
- Post-2001 commitment is to reduce greenhouse gas emissions (from non-renewable sources) per ton by at least 5%;

[158] http://www.baa.co.uk/main/corporate/sustainable_development_frame.html
[159] http://www.boots-plc.com/information/info.asp?Level1ID=5&Level2ID=13
[160] http://www.boots-plc.com/environment/information/info.asp?Level1ID=30&Level2ID=44
[161] http://www.boots-plc.com/information/
[162] http://www.ici.com/iciportal/sectors/plc.asp
[163] See detailed data in corporate environmental statistical report on the web: http://www.ici.com/icishe/2000/pages/past11.htm

- The company has expressed no intention to participate in JI/CDM mechanisms. Instead, ICI has adopted renewable energy targets as a method of reducing company-wide emissions; and
- The company pledged to report on CO2 emissions from energy use in offices and transport. [164]

Emissions data are based on the following information:

Table 5: ICI Greenhouse Gas Emissions 1995-2000, in tones CO2e

Substance	Potency Factor	Tons 1995	**EB Values 1995**	Tons 2000	**EB Values 2000**
Carbon dioxide	1	6,813,832	**6,813,832**	5,666,453	**5,666,453**
Methane	21	6,008	**126,168**	55	**1,153**
Nitrous oxide	310	570	**176,700**	0	**0**
EBGWP 1995* = 24,812,838 (36,052,358)					
EBGWP 2000 = 6,663,103					

***Source:* ICI Environmental Performance 1995-2000.**
***Note:* "EB" stands for emissions volumes adjusted by the GWP for each respective gas; GHG other than methane, carbon dioxide and nitrous oxides are not reported.**

Currently ICI is still verifying the volume of GHG emissions in the base year (2000) and constructing emissions baseline for its *Challenge 2005* commitments[165]. The finalized baseline emissions scenario will be published on ICI's website in May 2002.[166]

13.5. Marks & Spenser Plc.

Marks & Spencer is a retailer of clothing, foods, home-ware and financial services. It trades in 38 countries worldwide, and has a Group turnover of about £8 billion.[167]

Marks & Spenser is representative of the *largest* share of MACC2 participants who are developing 'in-kind' GHG emissions reductions measures not supplemented by company-specific quantified emissions reduction targets because a great deal of these companies do not fall into the domain of carbon-intensive manufacturers for which, similar to Germany and Scandinavian countries, quantitative targets are adopted on *sectoral* levels (see explanation at the beginning of

[164] http://www.ici.com/icishe/2000/pages/future03.htm
[165] ***Challenge 2005*** is the ICI environmental management program, which extends ***Challenge 2000*** initiative: see http://www.ici.com/icishe/2000/pages/past.htm
[166] The actual emissions by individual substances/pollutants are already reported on the ICI under the section 'Environmental performance 1995 to 2000", but due to business portfolio changes during and since 2000 the baseline has had to be adjusted to accurately represent those businesses which are part of the ongoing portfolio. Therefore, the information previously disclosed by ICI will be reviewed again in May 2002.
[167] http://www2.marksandspencer.com/thecompany/whoweare/index.shtml

the UK section). Thus, under the MACC2 commitment, Marks &Spenser pledged to increase the *efficiency of energy use* by 5% by 2002 (from 2000).[168]

Marks & Spenser summarized this commitment as follows:

> "*We were one of the first companies to support the 'Making a Corporate Commitment' campaigns, and we monitor our electricity usage every half hour in every store via a computer system. This allows us to immediately spot a problem... All store Energy Conservation officers will be re-trained during 2001 and every month specialist energy management consultants will conduct store audits. In October 2001, we also launched an incentive scheme where stores can keep the value of 10% of any savings they make over and above their budgets. We have also installed special monitoring equipment in seven stores to measure energy consumption in every area so that we can continue to improve our performance and taken advantage of government subsidies available for the installation of energy efficient equipment. All this saves us around 5% of our energy usage every year…*"[169]

No information is available on the actual GHG emissions levels from company's operations in 2000.

13.6. UK Coal Plc.

UK Coal Plc (formally RJB Mining Plc.) is the UK's largest coal mining company accounting for around 60% of UK coal production. It produces over 20 million tons of coal/year and employs 8,000 people at 40 locations throughout the United Kingdom,[170]

In 2000 UK Coal pledged to increase methane utilization at its collieries by 135% by 2005 (relative to 1998). This voluntary action will translate into the removal of the equivalent of 320,000 tCO2e/yr, increasing the total annual methane utilization to 555,000 tons/year. [171] This goal would place the total emissions reduction objective at 1.6 MTCO2e for 2001-2005.

UK Coal reports to be on course to meet its target: since 1995 (until 2000) its total methane emissions have fallen by 23%, a saving of 1.3 million tons of CO2e. On its way to further reducing GHG emissions from its operations, UK Coal focuses on clean coal and underground carbon sequestration proposals. The company argues that clean coal technologies combined with underground carbon sequestration are among the most economically-effective methods of reducing GHG emissions in the UK. [172]

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[168] http://www2.marksandspencer.com/thecompany/ourcommitmenttosociety/environment/reports/Environmental_Targets.PDF

[169] http://www2.marksandspencer.com/thecompany/ourcommitmenttosociety/environment/

[170] http://www.ukcoal.com

[171] Uk Coal Environmental Corporate Commitment: http://www.ukcoal.com

[172] http://www.rjb.co.uk/pdf/cctrev04.pdf: "Review of the Case for Government Support for Commercial Scale Cleaner Coal Demonstration Plant", UK Coal Plc. (2001), p. 21.

14. MEXICO

Mexico is not listed in the Annex I to the Kyoto Protocol; within the context of the Kyoto agreement, Mexico represents a CDM host-state. However, in connection with the US interest in North American emissions trading (see our Report #2 of October 2001), Mexico has reported a couple of emissions reduction initiatives, worth noting in conclusion of this appendix. Namely, Mexico City has recently voluntarily joined the aforementioned Chicago Climate Exchange[173] and PEMEX announced a voluntary emissions reductions target.

14.1. PEMEX

Pemex (Pétroleos Mexicanos) is a state-owned oil/natural gas exploration company of Mexico. It is also the fifth largest oil and gas developer in the world. In addition to oil/gas exploration and discovery, Pemex has branches in petrochemicals and other petroleum products. [174]

At the beginning of June 2001 Pemex announced that it would begin a six-month *internal* effort to cut carbon dioxide emissions by 1 percent below 1999 levels as a prelude to a more ambitious 10-year reduction program. In 1999 the company's facilities emitted 44 MTCO2e, which would place PEMEX's CO2 emissions reductions target to 0.44 MTCO2e.

EcoSecurities would like to stress that the above target is for international emissions reductions obligations. No information is available at this point with regards to the next emissions reductions moves by PEMEX. However, in lieu of the US interests in NAFTA-wide GHG emissions reductions initiatives, it is likely that PEMEX would become involved in North American emissions trading on the CDM side. It is important to stress that in such transactions PEMEX is likely to be a net carbon credit seller as it represents a CDM country regardless of its internal obligations to reduce GHG emissions.

[173] http://www.eyeforenergy.com/content.asp?news=23009
[174] http://www.pemex.com/mision.html

APPENDIX II

ENERGY STRUCTURE AND RENEWABLE ENERGY POLICIES IN ASIAN-PACIFIC ANNEX I

1. Japan

Japan Energy Data (1)	Total	By Source / Sector	
Consumption (1999)	22.0 quadrillion BTU	52.1% oil 15.3% coal 14.5% nuclear 12.7% gas 4.1% hydro 1.3% other renewable	50.5% industrial 19.3% transport 15.9% residential 14.4% commercial
Production (1999)	1,018 Bkwh 226 Gw capacity	59% thermal 30% nuclear 8% hydro 3% geo/solar/wind	

Japan is the fourth largest energy consumer in the world, behind only the United States, China and Russia. It is also the second largest energy importer (after the United States): Japan lacks significant domestic sources of energy and must import substantial amounts of crude oil, natural gas, and other energy resources, including uranium. In 1999, the country's dependence on imports for primary energy stood at more than 79%. (1)

- **Coal**: Japan has small coal reserves and minimal coal production. Overall, Japan accounts for about 22% of total world coal imports. (1)

- **Oil**: Japan contains almost no oil reserves of its own, but is the world's second largest oil consumer. Most of this oil comes from OPEC (75%-80%), as well as from China. (1)

- **Gas**: Japan has about 1.4 trillion cubic feet in proven natural gas reserves, with possibly more under the surrounding seabed. Roughly 97% of Japan's gas is imported in the form of liquefied natural gas (LNG). The majority of imports come from Indonesia (36%) and Malaysia (19%), with a small quantity from the United States. (1). A joint METI and Japan National Oil Corporation (JNOC) plan aims at increasing natural gas production over the next ten years. (1)

- **Nuclear**: Currently Japan ranks third worldwide in installed nuclear capacity, behind the United States and France. (1) Japan's nuclear output nearly doubled between 1985 and 1996. By 2008, nine new reactors are expected to be operating, providing an additional 11.3 GW in power-generating capacity.

- **Wind**: In 1999, Japan added 43.4 megawatts (MW) of wind capacity, increasing its total to 75.1 MW. The government has set a target to install an additional 300 MW by 2010. (2)

- **Geo**: As a volcanic island chain, Japan has significant potential for geothermal electricity generation. The country currently has 533 MW of installed capacity. (2)

- **Other**: The Japanese government also set targets to increase photovoltaic power generation to 5,000 MW by 2010 from its 1996 level of 55 MW; and waste power to 5,000 MW from the 1996 level of 890 MW. This compares to a planned 32% increase in thermal energy use over the same period. (2)

Fossil fuel legislation (2000-2001)

Until the end of the 1990s, Japan's electricity distribution was handled by a virtual monopoly of ten vertically integrated utilities, each with a specific geographic zone. Since then, deregulation has been a dominant theme in Japan's recent domestic energy legislation. A May 1999 amendment to the Electric Utilities Industry Law allowed a partial opening for new utility providers, which pressured the existing providers to become more efficient in the face of increased competition.

In March 2000, the Japanese government loosened the restrictions on electricity-selling firms, leading to the addition of seven new companies into Japan's power supply industry. (7)

Renewable energy legislation (2000-2001)

Japan continues to devote significant resources to less mainstream renewable energy technology programs such as wave/ocean power and waste-to-energy systems. The Japanese government also funds a relatively large amount of geothermal research, as there are a large number of geothermally active sites in Japan. (11)

Revised Energy Savings Law

The Revised Energy Savings Law was adopted in April 1999 and calls on central and local governments to offer effective economic incentives for domestic users of environmentally friendly products and technologies. (8) This Law is a follow-up to the June 1997 Law Concerning Promotion of the Use of New Energies, which encouraged the introduction of renewable and non-conventional fuels by providing financial assistance to any businesses using new energy sources. (18)

Green Credit System

METI's 1998 long-term energy consumption plan dictated a threefold increase in the use of renewable energy sources by 2010, primarily though a "Green Credit System" designed to give electricity producers incentives to purchase renewable energy, while also providing financial incentives for businesses to use unconventional energy sources. (8)

Under the Green Credit System (adopted in 2000), the Japanese government issues certificates to domestic electricity producers, which correspond to the amount of natural or recyclable energy they generate. Electricity retail companies choosing not to buy their specified amount of qualifying renewable-generated electricity would be required to purchase certificates, which would be freely tradable between electricity companies. (9)

Solar Energy Subsidies

In September 2000, MITI announced that it will stop subsidizing rooftop solar systems at the end of fiscal 2002. However, the 2001 METI budget for photovoltaic R&D showed an increase from 28.84 to 32.71 billion Yen. (10)

2. Australia

Australia Energy Data (3)	Total	By Source / Sector	
Consumption (1998)	2.97 quadrillion BTU	38.5% coal 38.3% oil 18.7% gas 3.8% hydro 0.8% other renewables	48% industrial 27% transport 15% residential 10% commercial (4)
Production (1999)	191.7 Bkwh37.9 Gw capacity	89.3% thermal (mostly coal) 10.7% renewables (mostly hydro)	

Australia is the world's leading coal exporter and has very large natural gas reserves. Australia is also the third-largest LNG exporter in the Asia-Pacific region. (3)

- **Coal**: Australia has been the world's largest coal exporter since the mid-1980s. Exports have more than doubled during this time, from 79 million metric tons in 1984 to 171 million metric tons in 1999. Over half of Australia's total coal production is exported, with around 70% bound for Japan and the rest to other Asian markets. (4)

- **Oil**: Australia's proven oil reserves (not counting shale oil) increased from 1.8 billion barrels in January 1998 to 2.9 billion in January 1999 and estimates remain at 2.9 billion barrels as of January 2001. Production is expected to decline to about 600,000 barrels per day by 2002, according to the *Australian Bureau of Agricultural & Resource Economics* (ABARE). (4)

- **Gas**: Australia's proven natural gas reserves more than doubled from 19.4 trillion cubic feet (Tcf) in 1998 to 44.6 Tcf in 1999, where they remained as of January 2001. The gas industry in Australia has exported US$1.4 billion of liquefied natural gas in 1999. (4)

Fossil fuel legislation (2000-2001)

Legislation for free and fair trade in natural gas was proposed in 1994 and finally passed by all state legislatures at the end of 1999, though it has not yet been implemented in all states and territories. This law aims to create a national pipeline access regime, which is intended to expand the market, create new investment in gas infrastructure, and encourage more exploration and development. (3)

The Australian Cabinet also endorsed a $900-million measure "to facilitate a greener Australia in the 21st century." (4) Components include financial incentives for commercial vehicle operators to use cleaner alternative fuels and guidelines to improve the recycling of waste oil.

Renewable energy legislation (2000-2001)

The Renewable Energy (Electricity) Act 2000

The Renewable Energy (Electricity) Bill of 2000 was passed by Federal Parliament on December 8, 2000. (13) The Act is the first legislative step in a program to address GHG emissions in Australia. It aims to reduce GHG emissions through increasing the share of Australian electricity generated by renewable means from 10.5 per cent to 12.5 per cent by 2010 relative to the base year of 2000. (12) Such action is expected to reduce Australia's GHG emissions by up to seven MTCO2e in 2010, requiring the contribution of an additional 9,500 GWh of renewable energy sources to Australia's electricity mix. (13)

The Mandatory Renewable Energy Target (MRET) in the Renewable Energy Target (electricity) Act of 2000 calls for the delivery of an increasing amount of additional renewable energy every year until 2010. The legislation defines the property right for Renewable Energy Certificates (RECs) as being 1 MWh of electricity generated from eligible renewable sources. (14)

Renewable Remote Power Generation Program

The $400-million Renewable Remote Power Generation Program, commenced July 2000, provides financial support for the conversion of diesel-based generators to generators, which instead use renewable energy resources and technologies. (4)

The Program primarily aims at increasing the use of renewable energy systems in remote areas of Australia, providing support for up to 50% of the capital costs of renewable energy installations. Implementation varies by territory, and sub-programs run by the governments of South Australia, Queensland, Northern Territory and the Aboriginal and Torres Strait Islander Commission are already operational. (17)

Photovoltaic Rebate Program

The Photovoltaic Rebate Program was designed specifically to support installation of grid-connected or stand-alone photovoltaic systems. Participants can receive rebates up to $8,250 for a 1,500-watt photovoltaic system. (4)

3. New Zealand

New Zealand Energy Data (5)	Total	.1.1.1.1 By Source
Consumption (1999)	0.8 quadrillion BTU	34% petroleum 31% hydro 23% gas 6% coal 6% other renewable
Production (1999)	37.952 Bkwh 8.135 Gw capacity	61.4% hydro 30.5% thermal 8.1% other renewable

.

Oil (Thousand Barrels per Day): (5) Production = 51.04 Consumption = 133.15 Import = 124.92 Export = 34.66	Coal (Thousand Short Tons): (5) Production = 4084 Consumption = 2362 Export = 1469 Import = 0
Natural Gas (Billion Cubic Feet): (5) Production = 204.05 Consumption = 204.05	

Hydroelectric generators play an unusually large role in New Zealand's electricity mix. (20)

Fossil fuel legislation (2000-2001)

In April 1998, the New Zealand Government announced an electricity reform package designed to promote effective competition in the NZ electricity market. Key aspects of the reform package include:

- Restructuring the ECNZ (Electricity Corporation of New Zealand) into three competing state-owned enterprises (SOEs) - Genesis, Meridian Energy and Mighty River Power; and
- Mandating the split of retail and lines businesses for all energy companies.

Renewable energy legislation (2000-2001)

National Energy Efficiency and Conservation Strategy

New Zealand's National Energy Efficiency and Conservation Strategy was adopted in 2001 as part of the Energy Efficiency and Conservation Act 2000. The Strategy sets out the responsibilities of the Minister of Energy in developing a national energy efficiency and conservation strategy, and establishes the Energy Efficiency and Conservation Authority (EECA) as a Crown entity. (16)

The Strategy has two main targets: a 20 percent improvement in New Zealand's energy efficiency and an increase of 19 to 42 percent in renewable energy production by 2012.

The renewable energy strategy is of critical importance for the nation since New Zealand is predicted to use 20 percent more energy by 2012 relative to 2001, with increasing reliance on fossil fuel sources. This is expected to push up CO_2 emissions by at least 45 percent above 1990 levels by 2012. (6)

The Strategy's priorities for renewable energy are as follows:

Renewable Energy Supply:

- Develop and evaluate mechanisms to increase proportion of energy from renewable sources.
- Carry out regional renewable energy resource studies including indigenous interests.
- Facilitate use of woody biomass in forestry processing sector.

Renewable industry development

- Develop a dynamic renewable energy industry capable of meeting market needs, thereby enhancing consumer confidence and providing the base for any export potential.
- Support renewable industry associations.
- Investigate possible support mechanisms for solar water heating industry.
- Investigate opportunities for transport biofuels.

Research on emerging energy supply technologies:

- Enhance FRST energy research focus on sustainable energy technologies.
- Monitor developments in fuel cell and hydrogen technologies and develop a work program to identify and evaluate alternative pathways for increasing the use of hydrogen as an energy carrier to maximize benefits to New Zealand's economy. (6)

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Appendix III

Greenhouse Gas Emissions Position for Selected Annex B States (Eastern and Southern Europe)

I. Introduction

This section completes EcoSecurities analysis of national emissions profiles. In this appendix, we focus on Greece, Portugal and Spain and on Bulgaria, Hungary, Poland, Romania, Russia and Ukraine from the group of Economies in Transition (EITs). Reports on other Annex B countries can be found in the first two Market Intelligence reports.

We begin by reminding the reader of the Kyoto/EU 'Bubble' emissions reduction requirements (Section I); we then proceed to summarizing the national emissions profiles for EITs and South European states in two separate sub-sections (in Section II). In Section III we provide a relatively more detailed analysis of individual emissions profiles for all above-mentioned jurisdictions.

Table I below summarizes the Kyoto and European emissions reduction commitments of the aforementioned countries. Note that Greece, Spain and Portugal are parties to the EU emissions reduction "Bubble" agreement, by which their emissions reduction targets differ from their Kyoto commitments.

Table I: Kyoto/EU Emissions Reduction Commitments for South European States and EITs, First Kyoto Commitment Period (2008-2012):

Country	Kyoto Emissions Reduction Commitment	EU "Bubble"[1] Emissions Reduction Commitment
Bulgaria	92% (-8%)	N/A
Czech Republic	92% (-8%)	N/A
Greece	92% (-8%)	+25%
Hungary	94% (-6%)	N/A
Poland	94% (-6%)	N/A
Portugal	92% (-8%)	+27%
Romania	92% (-8%)	N/A
Russia	100% (no change)	N/A
Spain	92% (-8%)	+15%
Ukraine	100% (no change)	N/A

The present analysis focuses on the largest emitting countries. As a result, Croatia, Estonia, Lithuania and Slovenia are not analyzed here. We have also omitted Liechtenstein, Monaco, Luxembourg and Iceland from our previous reports for the same reason.

II. <u>Summary</u>

II.1 Economies in transition

a) A note on the data

To discuss GHG emissions in economies in transition (EITs), EcoSecurities relied on the emission data and projections submitted to the UNFCCC by the Parties to the negotiation. It must be noted that these database are not complete, as some EITs did not report their respective emissions in recent years. In addition, EcoSecurities must state that there is a limited way of finding alternative sources of information, and therefore of cross-checking the data we used for this review.

We believe that EU accession should alter the emission trajectories of accessing countries, and therefore their positions related to their Kyoto targets. This is especially important for the Czech Republic, Hungary and Poland. We have no information at this stage on whether accessing countries would also join the EU "bubble".

However, we believe it is plausible that most East European states will participate in a European-wide burden-sharing agreement in the second Kyoto commitment period. Such development would inevitably affect their GHG policies/emissions profiles already at the end of the end of the first commitment period.

b) Potential positions

[1] The "Bubble" stands for an agreement between the EU states to *jointly* fulfill their GHG emissions reduction obligation of eight percent. Article 4 of the Protocol permits members to this agreement to fulfill their commitments jointly. Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom have become members of the "EU Bubble" at a meeting in Luxembourg (June 17, 1998).

For most EITs, our comparison of historical emissions to emissions projections strongly suggests that *most* East European states will become net sellers of carbon credits:

Table II.1: Emissions Trading Position, pre-Commitment Period, Economies in Transition:

Nation	Position: Buyer/Seller	Potential GHG Supply (for sellers) or demand (for buyers) (MTCO2e)
Bulgaria (Baseline/Intermediate Emissions Reduction Scenario)*	Buyer	13.5
Bulgaria (Stringent Emissions Reduction Scenario)*	Seller	10.45
Czech Republic	Seller	27-53 (depending on the forecasting scenario)
Hungary	Seller	10** (based on 2002 projections)
Poland***	Seller	3-85
Romania (Baseline/Ref. scenario)	Buyer	41
Romania (Stringent Emissions Reduction/High Reduction Scenario)	Seller	35
Russia	Seller	89-152 (depending on forecasting scenario)
Slovak Republic	Seller	5.5-13
Ukraine	Seller	68-152 (depending on scenarios)

***Source**: Own calculations*

***Notes:** *Bulgaria's emissions trading position depends on emissions growth projections contingent upon the stringency of the national emissions reduction initiatives; we chose to list outcomes of both emissions projections;*

***** Hungary's carbon trading position is derived on emissions projections ending in 2002; in addition, Hungary did not publish complete historical emissions data for the 1990s on which to base a detailed analysis of carbon trading position;*

II.2 Spain, Greece and Portugal

With regards to South European states we believe that all three countries will remain carbon buyers under their Kyoto targets, while with respect to the EU 'burden sharing' target (the EU "Bubble" agreement) the situation with Portugal and Greece is not as clear-cut due to high emissions allowance allocated to these countries by the European Union. Namely, Portugal appears to be in compliance with the EU "Bubble" target, which Greece may meet under the EU community support scheme, but Greece will fail meeting the EU target if GHG emissions reduction policies continue to develop under 'current trends' (1997).

As for Spain, it will remain a credit buyer under the EU 'burden sharing' requirements: judged by the data published in 1999, Spain has acceded its EU GHG emissions allocation by approximately 13.36 MTCO2e.

These facts are summarized below:

Table II.2: Emissions Trading Position, pre-Commitment Period, South European States:

Nation	**GHG Volume Expected to be Traded Under Kyoto Obligation (MTCO2e)**	**GHG Volume Expected to be Traded Under the EU "Bubble" obligation (MTCO2e)**
Greece (BAU and 'Current Trends' scenarios)	Buyer: 17.7--49.5	Buyer: 15.1
Greece ('Effects of Community Support Framework' Scenario)	Buyer: 32.1	Seller: 2.3
Portugal	Buyer: 35.23	Seller: 6
Spain	Buyer: 84.3	Buyer: 13.4

<u>Source:</u> Own calculations

Below we review individual country emissions profiles in the following order:

- Reported historical emissions;
- Principles guiding national emissions projections and resultant emissions forecasts;
- Our conclusions with respect to country positions with regards to being a credit buyer or credit seller.

III. <u>Country analysis</u>

III.1 Bulgaria

Table 1.1: Bulgaria, Historical GHG Emissions, in MMTCO2e (1990-1999):

	CO_2	CH_4	N_2O	Total
1988 (base)	103.86	28.01	25.23	157.09
1990	84.14	29.60	23.96	137.70
1991	66.04	28.42	21.22	115.68
1992	59.18	26.19	18.34	103.71
1993	61.86	23.55	16.68	102.08
1994	59.18	17.18	16.23	92.59
1995	62.33	18.6	17.11	98.08
1996	-	-	-	-
1997	59.15	18.74	6.57	84.46
1998	55.15	13.74	14.78	83.67
1999	-	-	-	79.99

<u>Note:</u> Data for and 1999 and 2000 are not available
<u>Source</u>: UNFCCC, greenhouse gas database

Bulgaria has selected year 1988 as its base year. Bulgaria Kyoto target is -8% below base year emissions. Bulgaria's aggregated GHG emissions in 1988 were 136.09 MTCO2e; the national target is thus to reach an average of 125.2 MTCO2 *per year* over the 2008-2012 period.[2]

[2] The Second National Communication has computed the emissions reduction target as follows: 5 (years) x 0.92(%) x 136.09 (base year emissions) = 626.03 MTCO2.

In Bulgaria's national communications to the UNFCCC, most efforts were directed towards estimating future emissions from energy-intensive and energy-producing sectors, which are the most significant contributors to GHG emissions in Bulgaria. In the First National Communication there were two macroeconomic scenarios developed in 1995:

- baseline scenario (BS)
- mitigation (energy efficiency) scenario (EES).[3]

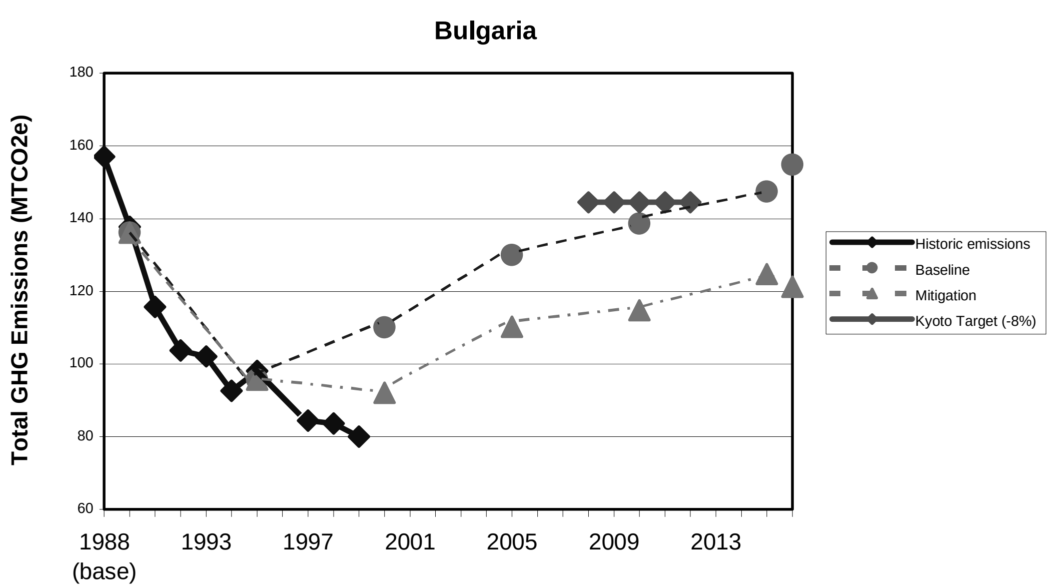
In the Second National Communication (1998), four GHG scenarios were produced: 1) baseline scenario, 2) energy supply, 3) energy efficiency, and 4) mitigation. The baseline scenario is consistent with the Draft National Energy Strategy. The other three are designed to identify potential effects of policies and measures with special attention to the energy efficiency.[4] Most projections are reported, however, for the 'baseline' and 'mitigation' scenarios:

Table 1.2. Total GHG Emissions Projections, Bulgaria, 1995-2020 (MCO2e)

Scenario	Gas	Year/ emissions	Year/ emissions	Year/ emissions	Year/ emissions	Year/ emissions	Year/ emissions
		1995	**2000**	**2005**	**2010**	**2015**	**2020**
Baseline scenario	CO_2	62.94	74.73	84.75	90.29	95.50	99.25
Baseline Scenario	CH_4	22.92	22.96	31.33	33.45	35.76	38.16
Baseline Scenario	N_2O	10.85	12.40	13.95	14.88	16.12	17.36
Baseline TOTAL	*Total*	95.71	110.09	130.03	138.62	147.38	154.77
Mitigation Scenario	CO_2	62.94	61.74	69.97	72.50	79.06	73.46
Mitigation Scenario	CH_4	21.92	19.51	27.95	29.23	30.79	33.24
Mitigation Scenario	N_2O	10.85	10.85	12.40	13.02	14.88	14.57
Mitigation TOTAL	*Total*	95.71	92.10	110.316	114.753	124.726	121.275

***Source:* Bulgaria's Second National Communication, p.p. 77-91.**

Figure 1.1: Bulgaria: Historical Emissions and Projections, 1990-2010:



***Source*: UNFCCC, EcoSecurities.**

[3] Bulgarian Second National Communication, p. 71.
[4] Bulgarian Second National Communication, p. 70.

Tables 1.1.and 1.2 above show that the Kyoto target is not likely to be reached under the 'baseline' scenario: the projections show 138.62 MtCO2e forecast for 2010 versus 125.2 MTCO2e required under the Kyoto target. Under this scenario, GHG emissions in 2010 exceed the target by close to 10 % due to both the planned diminution of nuclear energy production in the country electricity mix and because of the postponed introduction of GHG mitigation measures due to a lack of investments.[5] However, the Second National Communication stresses that intermediate emissions reduction actions (such as in the energy supply and energy efficiency scenarios) would allow the Kyoto reduction targets to be achieved.

At the same time, the Second National Communication states that: " …preliminary studies show that it would be extremely difficult to achieve this [Kyoto] target. It will require to pursue consistent policy and apply measures to reduce GHG emissions once the transition period is over and the recovery of the economy starts."[6]

In sum, EcoSecurities estimate that if Bulgaria cannot implement strict energy efficiency, fuel switching and other carbon-decreasing measures, it is likely to become a ***buyer of carbon credits***. Under the emissions baseline scenario, Bulgaria would have to purchase about 13.5 MTCO2.

Should the nation succeed in implementing *all* projected GHG reduction measures[7] it could become a carbon seller with the supply of about 10-45 MTCO2 by 2010. [8]

III.2 Czech Republic

Table 2.1: Czech Republic, Historical GHG Emissions, in MMTCO2e (1990-1999):

	CO_2	CH_4	N_2O	Total
1990 (base)	165.49	16.35	8.00	189.84
1991	153.14	14.93	7.25	175.32
1992	140.22	14.03	7.00	161.22
1993	134.85	13.3	6.57	154.71
1994	127.74	12.88	6.67	147.29
1995	128.82	12.59	6.70	148.10
1996	132.54	12.03	9.01	153.58
1997	137.23	11.81	8.88	157.82

[5] The reader should remember that the 'baseline scenario' mirrors the *Draft National Strategy*, which incorporates several energy policy changes to assist the restructuring of the national economy, where such changes were not initially planned to reduce the greenhouse gas emissions.

[6] Second National Communication, p. 1.

[7] According to the Second National Communication, such emissions reduction measures would include (among the others): restructuring of the vertically-integrated national electricity power; expansion of the national hydropower capacity; re-examination of national gas tariffs to increase efficiency of gas use; modernization of existing heating facilities and heat transmission facilities; establishment of the state energy efficiency fund; establishment of the National Energy Efficiency Agency to coordinate introduction of renewables (especially the water solar collectors); expansion of the existing wind power capacity (which stood at 100 kW in 1997); development of efficient wood cheep burning technologies for residential use; construction of street lighting networks and district heating networks; and import duty exemptions for most renewable energy technologies.

[8] However, EcoSecurities feels that such development remains unlikely due to the lack of necessary capital for the implementation of all measures planned in the National energy plans.

1998	128.27	11.12	8.39	147.78
1999	118.2	10.9	8.1	137.2

***Note*: Data for and 1999 and 2000 are not available**
***Source*: UNFCCC, greenhouse gas database**

Table 2.2. Czech Republic, total aggregated greenhouse gases emissions in 1990 and 1999, (MtCO 2 e), Percentages relative to the Base Year

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
100%	90.8%	82.7%	79.5%	76.4%	76.2%	79.7%	80.9%	77.2%	73.4%

***Source:* Czech Hydrometeorological Institute; Second National Communication, p. 10.**

The Czech Republic base year is 1990 (187.5 MtCO2e). Its emission target is –8% relative to base year, that is an average GHG emissions of 175 MtCO2e per year over the 2008-2012 period.

During the nineties, aggregated GHG emissions in the Czech Republic decreased from 189 MTCO2e in 1990 to 137 MTCO2e in 1999, resulting in a total emissions reduction of 26.8 per cent.[9]

The Third Czech National Communication was submitted to the UNFCCC in 2001. It included emission projections for two scenarios: central and high emission growth, with three variants in each case:

(i) without emissions reduction measures;
(ii) with measures; and
(iii) with additional measures.

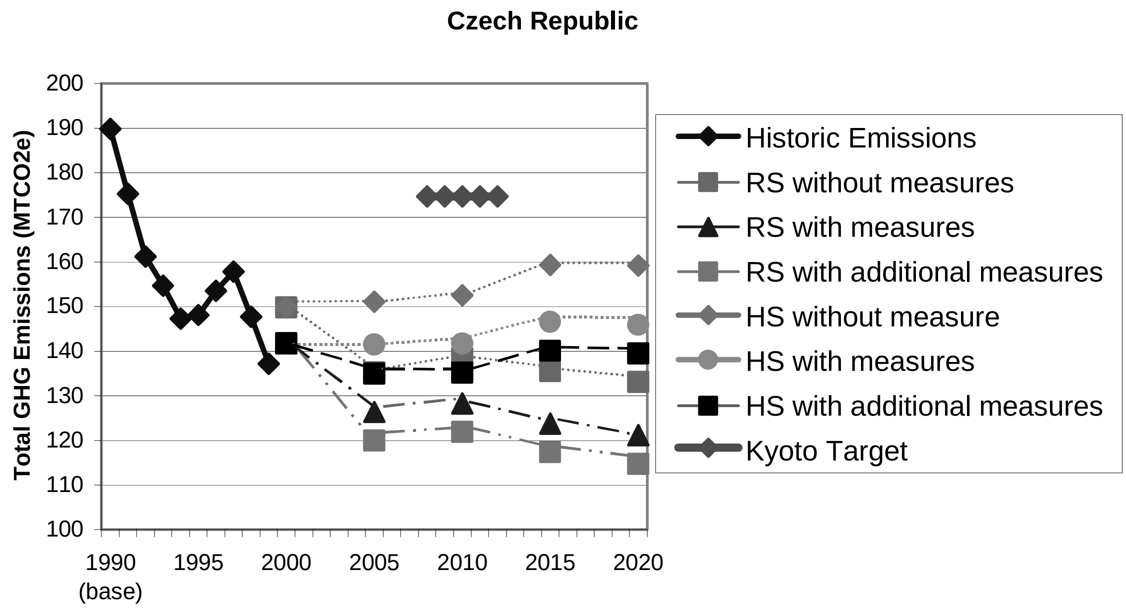
Table 2.3: Czech Republic Emissions projections for the "Reference scenario" (RS) and "High Emissions Scenario" (HS) without measures, with measures and with additional measures (MTCO2e)

	1990	1995	1996	1997	1998	1999	2000	2005	2010	2015	2020
Emissions Inventory	187.5	142.8	150.2	151.8	144.8	137.7					
RS without measures							149.8	135.3	138.4	135.5	133.1
RS with measures							141.8	126.4	128.3	123.8	121.2
RS with additional measures							141.8	120.0	121.9	117.4	114.8
HS without measure							149.8	151.1	152.6	159.4	159.2
HS with measures							141.8	141.5	141.7	146.6	145.9
HS with additional measures							141.8	135.0	135.2	140.1	139.5

***Source:* Czech National Communication, based on the data from SRCI CS s.r.o.,CHMI, p. 13.**

[9] Ibid. p. 10.

Figure 2.1: Czech Republic: Historical Emissions and Projections , 1990-2010:



***Source*: UNFCCC, EcoSecurities.**

We see in Table 2.2 that Czech Republic emissions have declined by 22.7 % between 1993 and 1999 due to a prolonged economic recession. The Czech Republic is therefore currently far below its Kyoto target.

All six scenarios prepared for the Czech National Communication show that emissions, though taking off again because of projected economic growth over the 2000-2010 decade, should remain below target in 2010. However, the magnitude of the headroom, and therefore the amount of AAUs the Czech Republic would be able to sell, differs among scenarios, with a minimum of 23 and a maximum of 54 MtCO2e. In other words, the Czech Republic is likely to be ***a net seller of carbon credits***.

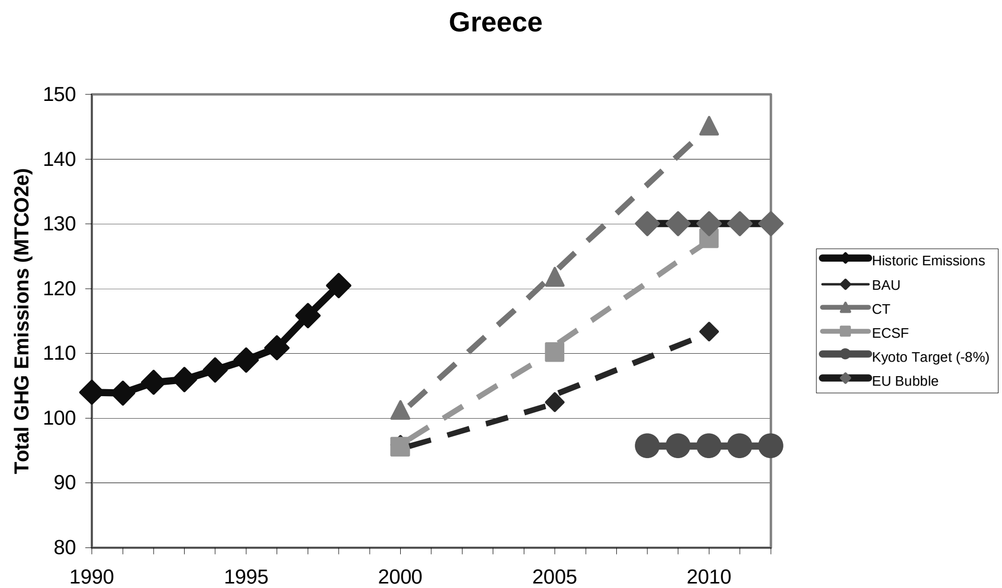
III.3 Greece

Table 3.1: Greece, Historical GHG Emissions, in MMTCO2e (1990-1998):

	CO_2	CH_4	N_2O	Total
1990	85.16	9.48	9.40	104.04
1991	84.94	9.56	9.38	103.88
1992	86.87	9.65	9.04	105.56
1993	87.29	9.75	8.94	105.98
1994	88.57	9.94	8.96	107.47
1995	90.12	10.07	8.80	108.99
1996	91.47	10.36	9.06	110.89
1997	96.18	10.50	9.20	115.87
1998	100.45	10.69	9.38	120.52

***Note:* Data for and 1999 and 2000 are not available on the UNFCCC website**
***Source:* UNFCCC, greenhouse gas database**

Figure 3.1: Greece: Historical Emissions and Kyoto Target (EcoSecurities), 1990-2010:



Source: ***UNFCCC, EcoSecurities.***

Greece 1990 emissions stood at 104 MtCO2e. The country target – under the EU "bubble" agreement – is to keep its 2008-2012 emissions below 125% of base year emissions, that is – on average -- below 130 MtCO2e per year during the 2008-2012 period.

In 1998, Greece emissions amounted to 120 MtCO2e, that is +15% compared to base year. In other words, Greece is currently below its EU "bubble" target.

On projections, the Second National Communication presented scenarios differentiated mostly on energy demand. We present the results of three of them:

1. Business-As-Usual (BAU);
2. Current Trends (CT), which considers substantial growth of energy demand; and
3. Effects of the Community Support Framework (ECSF)

Table 3.2.: Greece, CO2 Emissions Projections for 2005-2010, MTCO2e:

Scenario/year	2000	2005	2010
BAU	95.90	102.49	113.42
CT	101.31	121.82	145.18
ECSF	95.59	110.20	127.80

Source: ***Second National Communication (1997), p. p. 63-74.***

As shown in the table above, GHG emissions are projected to grow by 6 % between 2000 and 2005 (under *Business as Usual* scenario) and 10 % for the period 2005-2010 (Ibid). Under the *Current Trends* scenario, which pre-supposes a dramatic increase in national energy consumption[10], CO_2 emissions are projected to grow by 16 % between 2000 and 2005, and by another 20 % between 2005 and 2010.

[10] Historically, most Greek energy production is based on coal and oil. Although the recent negotiations with Russia's GASPROM indicate that Greeks will triple their imports of natural gas for expanding their electricity generation capacity, the nation is lagging behind in development of renewables and in adopting wide-spread

For the late 1990s we observed emissions growth rate of about 2.5-2.6 % per annum, which leaves us uncertain with regards to whether Greece will be able to meet the *national* CO2 emissions growth target of 13 % until 2010 (which would place Greece under the EU "Bubble" cap).

However, it must be noted that in 1998 and 1999 the rate of increase in GHG emissions was growing faster relative to the previous years, with electricity demand growing at 4 % per year by 2000. Considering Greece's heavy reliance on carbon-intensive fuels (especially coal), we are obliged to note our expectation of further acceleration in the growth of Greek GHG emissions.

As of 1998, the Greek government planned to reduce the growth rate of GHG emissions through a number of measures stipulated in the National Action Plan (PAN), which include (but are not limited to):

a) increased use of natural gas in electricity generation,
b) technological modification of existing power plants and the introduction of "clean coal" technologies,
c) energy conservation in transport,
d) increased energy conservation in commercial and residential sectors, and
e) expansion of renewables.

Based on the information publicly available on the PAN progress, Greece is likely to become a net carbon buyer with respect to the EU 'burden sharing' (EU "Bubble") emissions reduction target without substantial support for emissions reduction from the European Community. In case such support is rendered and additional carbon reduction policies planned, Greece has the potential to become a small-scale carbon seller under the "EU Bubble" requirements.

Note that under its Kyoto obligations Greece will remain a ***credit buyer*** under all scenarios of economic development and emissions growth.

III.4 Hungary

Table 4.1: Hungary, Historical GHG Emissions, in MMTCO2e ([1985-87]--1998):

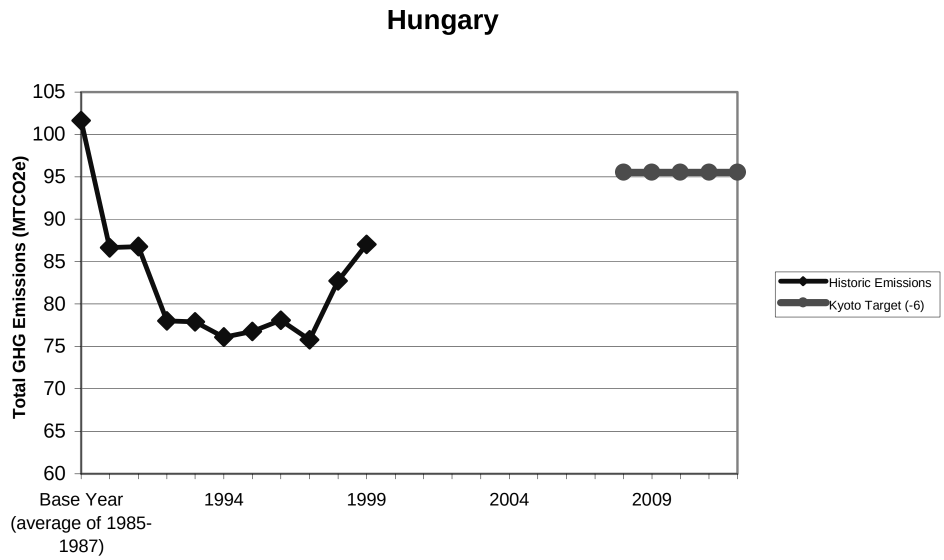
	CO_2	CH_4	N_2O	Total
average of GHG emissions of the 1985-1987	83.67	13.95	4.01	101.63
1990	71.68	11.44	3.52	86.63
1991	66.64	18.91	1.24	86.79
1992	59.80	16.73	1.5	78.03
1993	60.07	16.38	1.44	77.90
1994	58.44	16.05	1.60	76.09
1995	59.01	16.29	1.49	76.76

energy-conservation measures. Therefore, the "current trends" scenario appears to be a more reasonable estimation of emissions projections than "business as usual".

1996	59.72	16.84	1.51	78.07
1997	58.14	16.31	1.33	75.78
1998	57.60	14.25	10.88	82.73
1999				87.01

***Note*: Data for 2000 are not available**
***Source*: UNFCCC, greenhouse gas database**

Figure 4.1: Hungary: Historical Emissions and Kyoto Target, 1990-2010:



***Source:* EcoSecurities with the UNFCCC data**

Hungary uses the average of its GHG emissions from 1985, 1986 and 1987 as base emissions, which amount to 101.6 MtCO2e. The Kyoto target for Hungary is –6% compared to base year, or an average of 95.5 MtCO2e per year over 2008-2012.

In 1999, Hungary emissions were 87 MTCO2e; that is about 13% below base year emissions. In other words, in 1999 Hungary was slightly below its target.

EcoSecurities has found no emission projections over the next 10 years for Hungary. We comment briefly here on projections to 2002 that were released with the second (and latest to date) National Communication (1997).

In estimating future Hungarian fuel combustion-related CO_2 emissions, four emissions scenarios have been developed. Among them, the B-BAU (base –'business as usual') scenario stands for an unrealistic "no-growth" representation of economic development. The B-REF scenario reflects the structural changes in the Hungarian economy, including the increase of energy prices, which was modeled to lead to the improvement of energy intensity without energy saving measures.[11] The S-MOD (third) scenario is seen as the most realistic

[11] Although this scenario implies a certain improvement in energy intensity caused by the decline of energy intensive industries, no specific climate change mitigation measures are introduced. This scenario can be regarded as a reference baseline ("without measure") scenario. It emphasizes substantial economic restructuring of the Hungarian economy, but no specific climate change measures.

representation of medium-term socio-economic development. Under this setting, as a result of implementing energy efficiency and other GHG emissions reducing measures, the increase in energy demand is less than the rate of GDP growth.[12] The final (fourth) S-SEF scenario assumes a positive feedback between economic growth, social welfare and spending for energy efficiency improvements. It implies significant progress in the utilization of technically plausible energy saving potential.

A different set of methods and scenarios were used for estimating non-CO_2 emissions because of the lack of data and questions related to appropriateness of methodology for making agriculture-related projections.[13] Therefore, we do not report non-CO2 emissions projections:

Table 4.3: Hungary, CO_2 Emissions Projections, 1990-2002 (in MT)

Emissions Scenarios	1990	1992	1995	1997	2000	2002
Actual	68.6	59.6	59.4			
B-BAU				62.0	63.9	65.2
B-REF				61.8	63.1	64.0
S-MOD				62.1	64.3	65.9
D-SEF				62.4	65.6	67.8

***Source:* Hungarian Second National Communication, p. 13.**

When comparing emissions projections with historical emissions, and considering that emissions projections were released for CO_2 only, EcoSecurities believes that by 2000 Hungary was well on its way to meeting Kyoto obligations with respect to carbon dioxide emissions. This argument is supported by our brief review of Hungarian energy efficiency and renewable energy policies.

However, EcoSecurities cannot make any definitive conclusions with respect to Hungary's ability to meet its Kyoto target because of the lack of emissions projections until 2010. We can only emphasize, in conclusion, that the country has made some visible progress on the road to building a wider base for renewables and utilization of energy efficiency measures. [14]

In sum, based on the projections available until 2002, EcoSecurities believes that Hungary could become a *carbon credit seller*, but we emphasize that this conclusion is based on four-year-old data, when Hungary recorded a substantial decline of national CO2 emissions due to economic slowdown. Thus, this is *not* a definitive conclusion.

[12] Under S-MOD, in the period of 1996-2002 the GDP was projected to rise by approximately 15 per cent, while the total final energy consumption was forecast to increase by 8 % only.

[13] Since the release of its First National Communication in 1995, Hungary has made neither updates nor advanced estimations for the CH4, N2O and CO emissions in preparation of its Second National Communication. Therefore, the validity of non-carbon dioxide projections is highly questionable, since these data may not reflect the true state of affairs in post-1995 Hungary. Hence, the projections reported below are given for CO2 emissions only.

[14] To achieve the Kyoto emissions reduction target of 6 per cent, Hungary has made the development of energy efficiency projects and renewable energy high priorities, where the primary goal is to increase the share of renewable energy sources in the primary energy balance to 5-6% by 2001-2002. In 1997 the country had over 70 biomass-fired boiler plants, where the total installed capacity amounted to 31 MW.

In 1997 Hungarian traffic accounted for 45-50 % of carbon monoxide emissions, 40 % of discharges in nitrogen oxides, and approximately 14 % of CO2 emissions. But since the majority of Hungarian GHG emissions are comprised of CO2, where the contribution of transportation is minimal, we do not see that Hungary's ability to meet its Kyoto target will be severely and negatively affected by the growth of transportation emissions in the long run.

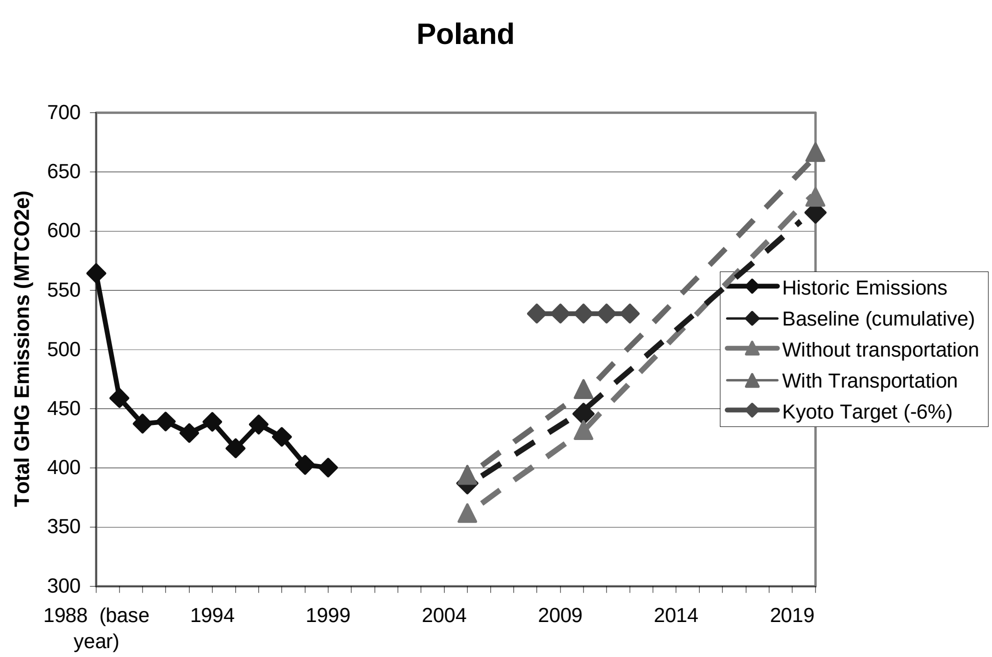
III.5 Poland

Table 5.1: Poland, Historical GHG Emissions, in MMTCO2e (1990-1998):

	CO_2	CH_4	N_2O	Total
1988 (base year)	476.63	65.96	21.70	564.29
1990	380.70	58.82	19.53	459.05
1991	366.96	54.37	16.13	437.45
1992	371.59	51.95	15.50	439.05
1993	363.16	51.07	15.42	429.65
1994	371.59	51.81	15.50	438.90
1995	348.17	51.60	16.73	416.51
1996	372.53	47.30	16.72	436.55
1997	361.63	47.85	16.74	426.22
1998	337.45	49.04	15.98	402.48
1999	329.74	22,50	.	400.24

***Note:* Data for 2000-2001 are not available**
***Source*: UNFCCC, greenhouse gas database; Third National Communication (November, 2001)**

Figure 5.1: Poland: Historical Emissions, Emissions Projections and Kyoto Target, 1990-2010:



***Source:* EcoSecurities with the UNFCCC data**

Poland's base year is 1988, where the country emitted 564 MtCO2e. Poland's Kyoto target is - 6 % below base year, averaged from 530 MtCO2e per year over the 2008-2012 period.

In 1999, Poland's GHG emissions were 400 MtCO2e, that is 29% below base year. Hence, in 1999 Poland was far below its Kyoto target.

In its third national communication, Poland presented emission projections for six economic sectors: power generation, manufacturing, transport, agriculture, forestry and services/household sectors. It must be noted that in the mid-1990s these scenarios were prepared by several groups of national experts working independently (but in a coordinated manner); the resulting projections are therefore not highly congruent with respect to their assumptions.[15]

Specifically, the Third National Communication states that: "…results of projection estimates… may not be fully compatible. This especially relates to the macroeconomic assumptions … for energy sector modeling as well as to the results of modeling aggregated effects of measures undertaken in the entire economy…"[16] Therefore, there is a certain methodological problem in attempting to derive total /cumulative national emissions projections because these are derived on the basis of varying assumptions.

However, the pre-1999 Poland's emissions projections were based on the three groups of macroeconomic scenarios:

- The baseline scenario;
- The *Success* scenario– considers the situation when structural economic changes are faster and deeper than in the baseline case; and
- The *Stagnation* scenario – assumes structural changes are slowed down.

Most recent history (the late 1990s) has shown that change in emissions occurs in accordance with the '*success scenario'*, due to the accelerated process of changes in the economic structures towards *more* energy and material saving. Therefore, in 1999 the three above scenarios were updated, where '*success scenario*" now stands closer to the baseline case, and the 'passive' scenario corresponds to the above stagnation scenario with high unemployment, negative trade balance and a low economic growth rate.[17]

In addition, both post-1999 scenarios of national economic development are modeled with respect to implementing additional emissions reduction measures and *without* such measures.

Projections are summarized below:

Table 5.2: Poland, Projections of CO2 emissions, 2005-2020, MTCO2e:

Sector Considered	Scenario	2005	2010	2020
Electrical Power Engineering	Base-line [18]	127-129	121-125	96-107
Electrical Power Engineering	Passive[19]	159	173	187

[15] Ibid., p. 54.
[16] Third National Communication, p. 54.
[17] Ibid., p. 58.
[18] The baseline scenario presumes GDP growth rate = 4.8% to 6.0% (until 2020), and energy intensity of GDP declining by 51% by 2010; while the passive development case presumes GDP growth rate of 1.9%-5% until 2020, and energy intensity declining by an average of 34% by 2010.
[19] The passive scenario presumes the lower rate of economic development, negative balance of trade and low unemployment reduction rate; both 'base-line" and "passive" scenarios are based on the ***same*** macroeconomic assumptions.

Manufacturing	Base-line (with policies in place by 1995)	224	283	469
Manufacturing	Passive	203	259	442
Transportation	Base-line (with policies in place by 1995)	34.20	37.77	39.61
Transportation	Reduction base-line (with additional measures specific to transportation)	32.12	34.53	37.76
Cumulative (total)	Baseline	387.20	445.77	615.61
Cumulative (total)	Passive OR reduction base-line for transportation	362 without transportation + 32.12 from transportation	432 without transportation + 34.53 from transportation	629 without transportation +37.76 from transportation

<u>Source</u>*: *Third National Communication, 2001, p.p. 54-65.

The Third National Communication indicates under all scenarios, Poland should remain below its Kyoto target in 2010.[20]

Beyond 2010, The Third National Communication suggests that further reduction of the rate of carbon dioxide emissions in the national economy is very likely, due to active restructuring of the Polish economy away from carbon-intensive activities. However, if such reduction is not achieved as expected, Poland's GHG emissions are likely to exceed the Kyoto target *immediately* after the first Kyoto commitment period (see graph 5.2 above).

The Third National Communication also shows emissions projections for nitrous oxides (N_2O), where a slight growth in these emissions is expected from 77 MTCO2 in 2000 to 81 MTCO2e for the 'no-growth' economy scenario, 78 MTCO2e for the 'passive economy scenario' and 86 MTCO2e for the 'active economy growth' case in 2010.[21] Considering that nitrous oxides are over 300 times more potent (in terms of global warming) than carbon dioxide, the projected high rate of N_2O emissions growth could potentially create minor complications in Poland's capacity to meet its Kyoto emissions reduction commitment. However, the Polish government has already addressed this problem.[22]

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[20] Poland believes that national economic restructuring will by itself substantially lower carbon dioxide emissions. Thus, in the short term, Poland sees no need for a specific carbon emissions policy until 2008 *beyond* implementing wide-scale energy efficiency measures, collecting 'climate change fees' from carbon-intensive enterprises, carrying out extensive fuel switching and a series of programs converting coal to natural gas (historically, Polish energy sector has been very heavily reliant on coal (with hard coal extraction in 1996-97 retained at the levels of 138 million tons per year; in 1999 the share of hard coal in use for the domestic energy needs was close to 52 per cent, whereas the share of brown coal was 14 per cent.)

The national fuel switching/renewables goal is to reduce reliance on coal to 60 per cent by 2025 and to increase renewable energy share in the overall national energy balance to 14 per cent by 2020.

In addition, the Polish Government has been very active in the *Joint Implementation* pilot phase. Poland listed eight Joint implementation projects set up until the end of 2001, mainly in development of renewable energy and fuel switching.

[21] In order to meet its Kyoto emissions reduction commitment, Polish N2O emissions should remain at approximately 20 MTCO2e (by 2010) unless Poland can orchestrate an additional decrease in CO2 emissions to offset the growth of N2O discharges, which would absorb the 'excessive' N2O release. [21] The Third National Communication stated that in 1999 N2O emissions "…exceeded the base year emissions by 7%…The proportions of the composition of aggregate emissions of greenhouse gas changed in 1999 in relation to 1988 towards reduction of carbon dioxide share to 82% with parallel shift [*increase*] in nitrous oxide up to 6%." (p. 32).

[22] Fortunately, the share of Poland's N2O emissions relative to other GHG gases constitutes only 0.002 per cent (Third National Communication, p. 62), which means that Poland still remains on a good track to meeting its Kyoto obligation. Still, acknowledging this challenge, the Polish Ministry of the Environment has developed a

To sum up, EcoSecurities considers that Poland is very likely to become a ***seller of carbon credits*** during the first Kyoto commitment period.

III.6 Portugal

Table 6.1: Portugal, Historical GHG Emissions, in MMTCO2e (1990-1998):

	CO_2	CH_4	N_2O	Total
1990	43.13	14.49	6.23	63.86
1991	44.98	15.10	6.26	66.33
1992	48.93	13.85	6.18	68.96
1993	47.77	13.46	6.18	67.41
1994	48.59	13.71	6.02	68.32
1995	51.53	14.62	6.45	72.60
1996	49.82	13.85	6.45	70.12
1997	51.51	13.58	6.49	71.58
1998	53.89	14.35	6.63	74.87

***Source*: UNFCCC greenhouse gas emissions data**
Note: Data for 1999-2001 are not available

Portugal base year (1990) emissions were 63.86 MtCO2e. Portugal Kyoto commitment is –8% below this base year, but within the EU "bubble" agreement, the country can increase its emissions by 27% -- that is to emit no more than an average of 81.1 MtCO2e per year over the 2008-2012 period.

In 1998 Portugal GHG emissions were 74.87 MtCO2e, that is 17% above 1990 levels. In 1998, Portugal was thus below its EU "bubble" target.

Two separate projections of CO2 emissions[23] were carried out in the preparation of the Second National Communication (1997). The first one was based on assumptions of high level of national economic development, as well as substantial population growth, but without substantial emissions reduction measures. The second contains environmentally-restrictive estimates, where economic growth and emissions rates are specifically adjusted to meet Portugal's Kyoto emissions reduction commitment. A "bottom-up" methodology was used, in which it was possible to simulate national energy consumption via the modeling of the existing demographic, economic and social trends.[24]

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separate strategy for reducing nitrous emissions at the end of 2001, where the majority of actions target emissions from agriculture (which contributes close to 60 % to the growth in nitrous emissions) and the Polish chemical industry. Transportation emissions do not appear to be significantly affected by Poland's ongoing emissions reduction plans.

[23] We stress that hereafter we talk about *carbon dioxide* emissions projections, and not about the 'all three Kyoto gases' projections (i.e., the projections for CH4 and N2O are not included in the following table).

[24] The energy demand model, which constitutes a part of the second projection exercise, was developed on the basis of analyzing energy consumption patterns by the largest uses of energy in each sector – namely, industry, transport, services, agriculture & fisheries and construction.

The calculation of the effects of energy policy measures enabling CO2 and other GHG emissions reductions have been prepared for three types of measures:

- Energy diversification through the introduction of natural gas;
- Promotion of the use of renewable energies; and

The effects of limiting emissions of carbon dioxide are the result of the difference between the emission values calculated for the two aforementioned scenarios: with the existing measures and with the existing *plus additional* measures. The national CO2 emissions projection shown below demonstrates the aggregate emissions which correspond to the 'without emissions reduction measures' scenario:

Table 6.2. Portugal, Aggregate CO2 Emissions and Emissions Projections, 1990-2010 (MTCO2e):

CO2	1990	1995	2000	2005	2010
Combustion: Energy Industries	15.79	20.02	20.96	24.23	27.14
Combustion: Industry	7.77	8.10	9.44	10.30	11.21
Combustion: Transport	9.62	12.79	14.04	15.75	17.13
Combustion: Other	4.08	4.80	5.69	6.32	7.04
Other (Biomass and Bunkers, etc.)	7.11	7.33	8.99	10.43	12.39
TOTAL CO2	44.37	53.04	59.12	67.03	74.91

Source: ***Second National Communication, Appendix II, p. 119.***

When differentiated according to the two scenarios mentioned above, the cumulative CO2 projections will look as follows:

Table 6.3. Portugal, Cumulative CO2 Emissions and Emissions Projections[25], 1990-2010 (MTCO2e):

CO2	1995	2000	2005	2010
Without emissions reduction measures (estimates of *Directorate General*)	54	61	68	76
With measures to meet national Kyoto commitment	51	55	59	62

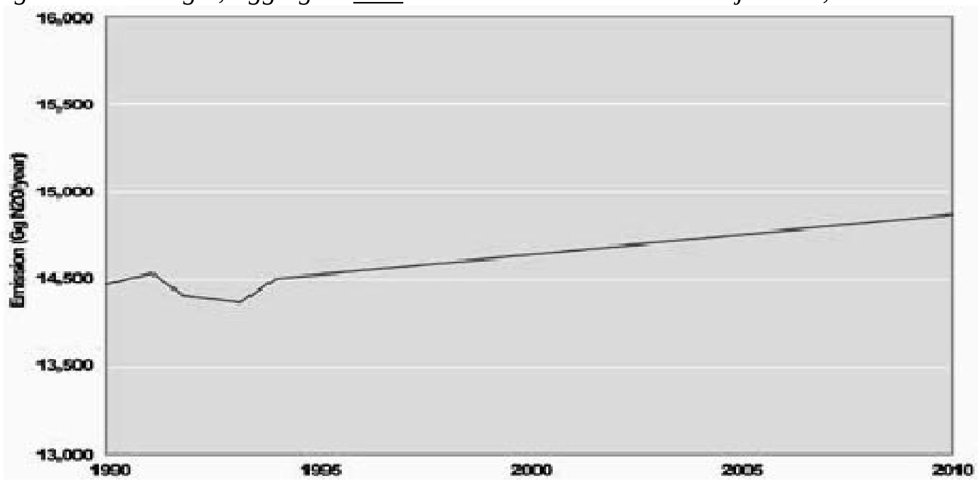
Source: Second National Communication, p.55, Section 4.2.

If Portugal were to implement radical emissions reduction measures including wide-scale introduction of natural gas and renewable capacities, the country will be slightly *below* the Kyoto emissions reduction target with respect to *carbon dioxide* emissions. However, the Second National Communication revealed the increase in N2O emissions:

• Promotion of energy efficiency in all industrial cycles and electricity generation.

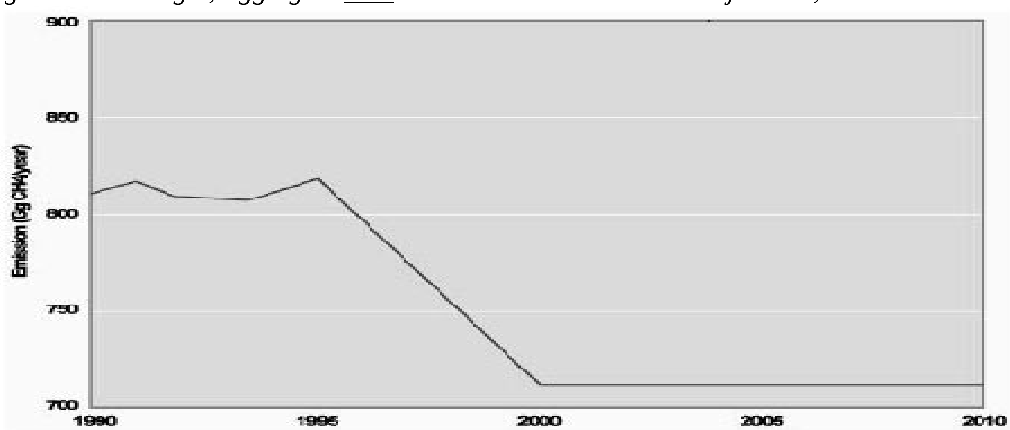
[25] Approximate forecasts since the data are read from graphs: see the *Second National Communication*, p. 55.

Figure 6.1. Portugal, Aggregate N2O Emissions and Emissions Projections, 1990-2010:



***Source*: Second National Communication (1997), p. 56**

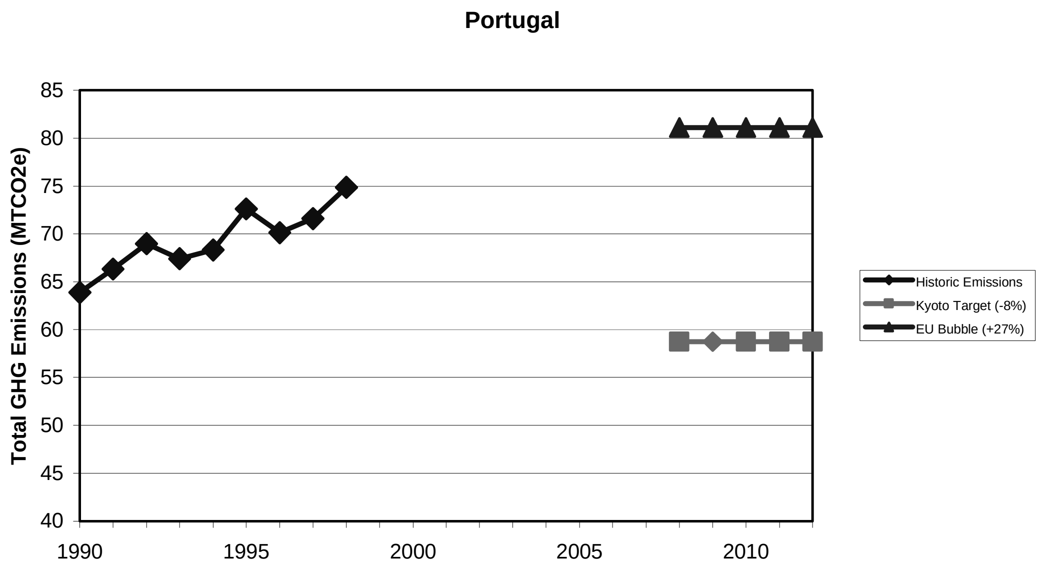
Figure 6.2. Portugal, Aggregate CH4 Emissions and Emissions Projections, 1990-2010: [26]



***Source*: Second National Communication (1997), p. 56.**

[26] EcoSecurities resorts to presenting emissions forecasts in the form exhibited in the Second [national] Communication (1997) to avoid any misrepresentation since Portuguese report avoided elaborating on the volume of potential CH4 emissions beyond the details shown in the above graph.

Figure 6.3: Portugal: Historical Emissions and Cumulative Emissions Forecasts (EcoSecurities), 1990-2010:



***Source:* EcoSecurities with the UNFCCC data**

In sum, Portugal appears to have surpassed its Kyoto emissions reduction target (with regards to which it is a carbon credit buyer), but it remains within the 'good compliance' boundaries of its EU "Bubble" provision. Measured against the EU commitment, Portugal may become a non-trading state, taking neither a 'seller' nor 'buyer' position.

Theoretically, there is always a chance for Portugal to become a ***carbon seller*** under the EU 'burden sharing' provisions should Portugal be able to further reduce its CO2 emissions versus national emissions projections.

III.7 Slovak Republic

Table 7.1: Slovak Republic, Historical GHG Emissions in MMTCO2e (1990-1998):

	CO_2	CH_4	N_2O	Total
1990 (base)	62.24	7.64	6.16	76.03
1991	54.50	7.01	5.23	66.74
1992	50.31	6.38	4.61	61.30
1993	47.98	6.04	3.87	57.89
1994	45.18	5.89	3.92	54.98
1995	46.62	6.08	4.09	56.79
1996	46.99	6.26	3.41	56.66
1997	46.40	5.99	3.41	55.81
1998	43.77	5.65	3.32	52.74

***Note*: Data for 1999 and 2000 are not available**
***Source*: UNFCCC, greenhouse gas database**

Table 7.2. Slovak Republic, total aggregated greenhouse gases emissions from 1990 to 1998, ($MtCO_2e$), Percentages relative to the Base Year:

1990	1991	1992	1993	1994	1995	1996	1997	1998
100%	87.78%	80.63%	76.14%	72.31%	74.70%	74.53%	73.40%	69.37%

***Source:* Calculated from UNFCCC data**

The Slovak republic base year is 1990, at which date country GHG emissions were 76 MtCO2e. The Slovak Republic Kyoto target is –8% compared to base year, that is an average of 69.9 MtCO2e per year over the 2008-2012 period.

During the 1990s, Slovak Republic emissions decreased from 76 MTCO2e in 1990 to 53 MTCO2e in 1998, a 20.6 % decrease. In other words, the Slovak Republic is currently on line with its Kyoto commitment.

The Third Slovakian National Communication was submitted to the UNFCCC in October of 2001. Two emission scenarios were prepared: a reference case and high emissions case, each with three variants:

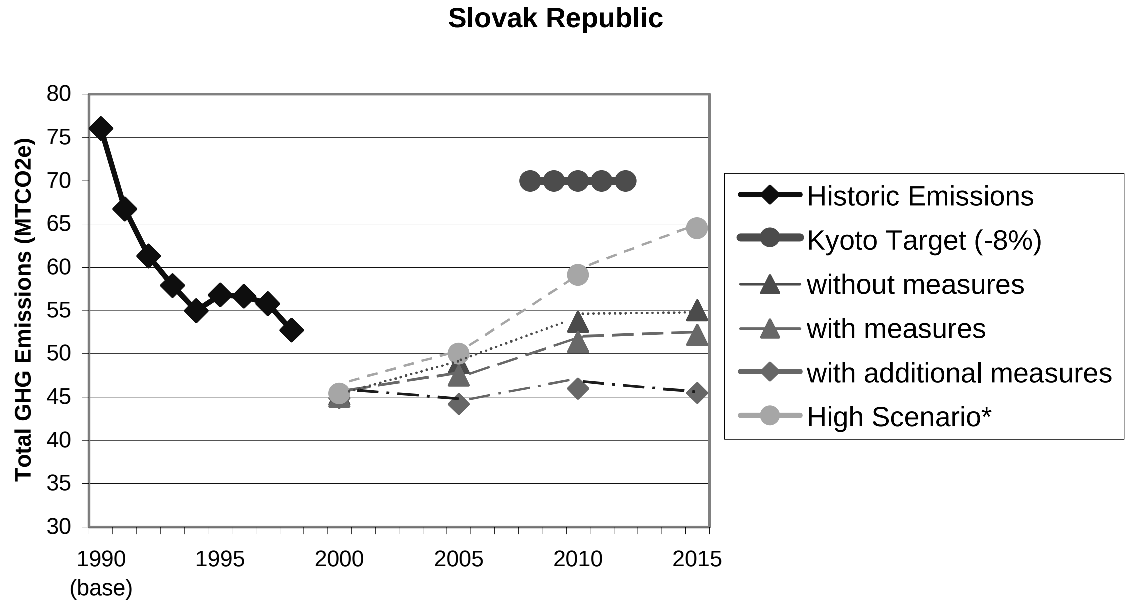
(i) without emissions reduction measures;
(ii) with measures; and
(iii) with additional measures.

Table 7.3: Slovak Republic Emissions projections: reference scenario (3 variants) and high emission scenario (without measure) (MTCO2e):

	1990	1995	1996	1997	1998	2000	2005	2010	2015
Emissions Inventory	76.03	56.79	56.66	55.81	52.74				
without measures						45.29	48.93	53.69	55.02
with measures						45.04	47.48	51.38	52.18
with additional measures						44.89	44.18	45.97	45.46
High Scenario*						45.4	50.0	59.1	64.5

***Source*: Slovak Republic Third National Communication, p. 68**
High Scenario estimated from graphical representation given in Figure 5.3 of Third National Communication, page 68.

Figure 7.1: Slovakia: Historical Emissions and Emissions Projections, 1990-2010:



***Source:* EcoSecurities with the UNFCCC data**

In all projections mentioned above, Slovak Republic GHG emissions stay below the Kyoto targets until 2010, even in the high scenario. Based on this review, EcoSecurities concludes that it is likely that the Slovak Republic will be a ***carbon credit seller***. Minimum surplus (as in the high growth case) could be around 5 MtCO2e.

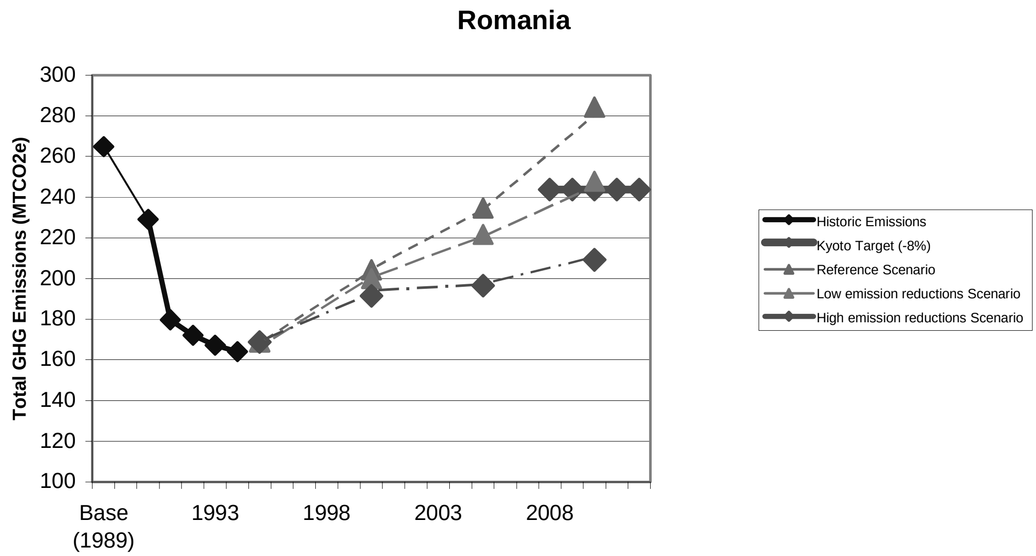
III.8 Romania

Table 8.1: Romania, GHG Emissions, 1988-1994, MTCO2e:

	CO_2	CH_4	N_2O	Total
1989	194.83	49.50	20.56	264.88
1990	172.51	41.50	15.10	229.11
1991	135,66	36.42	7.68	179.76
1992	130.16	33.67	8.34	172.17
1993	127.09	31.98	8.12	167.19
1994	126.00	30.68	7.75	164.03

***Note:* Data for 1995-2000 are not available**
***Sources:* UNFCCC database of greenhouse gases and Second National Communication (1998)**

Figure 8.1. Romania: Historical Emissions and Kyoto Target, 1989-2010:



***Source:* EcoSecurities with the UNFCCC data**

Romania Kyoto base year is 1989, where its emissions were 265 MtCO2e. Under the Kyoto Protocol, Romania's target is –8% compared to base year, that is average emissions of 243.7 MtCO2e per year over the 2008-2012 period.

EcoSecurities is not able to assess the likelihood of Romania meeting its Kyoto emissions reduction target due to a lack of data on GHG emissions for the late 1990s. As a result, we are in position to make only a limited set of observations.

First, last data posted by Romania to the UNFCCC showed its emissions were 164 MtCO2e, that is 38% below base year, and thus well below Kyoto target.

Table 8.2. Romania, Aggregated Greenhouse Gases Emissions, 1988-1994, (MtCO2e), Percentages Relative to the Base Year:

1988	1990	1991	1992	1993	1994
100%	86.49%	67.86%	64.99%	63.11%	61.93%

***Source*: Calculated from UNFCCC data**

However, Romania's emissions position by the mid-1990s cannot be taken as an indicator of its emissions profile one would expect to see by the end of the 1990s, because most EIT countries experienced substantial economic growth in 1998-1999.

Romania's emissions projections were carried out under the framework of the *US Country Study*. The assumptions for the analysis were based on the economic situation in 1996.

All projections of GHG and assessment of the effects of emissions reduction measures were performed within 25 alternative scenarios against the conventional reference case.[27] In all

[27] The CO2 2010 emissions projections were based on a number of considerations, including:

- structural change and modernization of the economy sector;
- different options for energy import supply and development of the

electricity generation capacity;

emissions scenarios the biggest emissions share, in 2010 fell on the energy sector followed by industry. The Second National Communication mentions that transportation and agriculture were expected to remain sectors with low emissions.

Table 8.3. Romania, Aggregated GHG Emissions Projections, 1995-2010 (MTCO2e):

	1995	2000	2005	2010
Reference Scenario				
Total CO_2 emissions	130.82	162.33	187.79	228.54
Total CH_4 emissions	30.88	33.53	36.74	43.13
Total N_2O emissions	7.01	8.48	10.24	12.70
Total Emissions	168.71	204.35	234.77	284.36
Low emission reductions Scenario				
Total CO_2 emissions	130.82	158.45	178.93	201.45
Total CH_4 emissions	30.88	33.45	33.71	36.37
Total N_2O emissions	7.01	8.13	9.02	10.11
Total Emissions	168.71	200.02	221.66	247.93
High emission reductions Scenario				
Total CO_2 emissions	130.82	150.81	156.43	167.66
Total CH_4 emissions	30.88	32.88	32.16	33.23
Total N_2O emissions	7.01	7.74	7.90	8.26
Total Emissions	168.71	191.43	196.50	209.14

***Source*: Romanian Second National Communication, 1998, p. 9**

According to the above projections, Romania misses its Kyoto target except in the "high emissions reduction scenario". However, due to lack of recent data and projections, EcoSecurities cannot make any assessment of Romania's future position.

III.9 Russia

Table 9.1: Russia, GHG Emissions, 1990-1996, MTCO2e:

	CO_2	CH_4	N_2O	Total
1990	2,372.30	556.50	69.97	2,998.77
1994	1,660.00	411.81	39.56	2,111.37

- development of the cogeneration;
- reduction of energy losses in heat networks;
- increase of building weatherization; and
- penetration of the performance vehicles for freight and passengers

transportations.

(Romanian Second National Communication, p. 61)

1995	1,590.42	400.34	43.09	2,033.85
1996	1,495.92	389.42	40.92	1,926.26

Note: ***Data for 1997-2000 are not available; data for 1991-93 are missing***
Sources: ***UNFCCC database of greenhouse gases***

The Russian Kyoto commitment is a stabilization of emissions at 1990 levels, that is 2,998.77 MMTCO2e per year over the 2008-2012 period.

In 1996, Russian emissions were about 64 % below base year, indicating that Russia was at this time well on line with its target.

Russia's Second National Communication (1998) presents three emissions projection scenarios:

- Baseline – which includes implementation of the most necessary energy efficiency measures, leading to an energy savings rate of approximately 0.5 per cent/year;

- Pessimistic (stagnant economic growth or a negative growth rate) – energy efficiency measures lead to the reduction of energy intensity at a rate of 1.75 per cent/year until 2000 and in the period 200-2005 the energy savings rate drops to 1.5 per cent/year; and

- Optimistic (substantial economic growth rate) – scenario considering the substantial influx of private capital in national energy efficiency programs/projects, leading to the reduction of energy intensity by 2 per cent/annum.[28]

All forecasts were made under the assumption that in 2000-2010 Russian energy use is likely to increase by 30-45 % (relative to 1998 levels) as the economy bounces back from a deep recession. The '*baseline*' and '*pessimistic*' scenarios also indicate no substantial changes expected in 2000-2010 in carbon-intensity of the Russian economy; for both scenarios the maximum reduction of national carbon intensity is 6 per cent.

All CO_2 and subsequent forecasts were carried under the following assumptions:

Economic growth rate:	4 % (on average);
Carbon intensity of the national economy:	no change to –0.1 per cent;
Population growth rate:	0 per cent.

In these projections, nitrous oxide and other GHG emissions are extrapolations of the pre-1996 rate of GHG emissions growth.

Table 9.2: Russia, GHG Historical Emissions and Emissions Projections, 1990-2010, MTCO2e:

Gas/Scenario	1990	1994	2000 (projection)	2005 (projection)	2010 (projection)
CO_2					
Baseline	2,372	1,660	1,800	2,140	2,540
Pessimistic	N/A	N/A	1,750	2,000	2,300
Optimistic	N/A	N/A	1,730	1,950	2,180
CH_4	557	412	445	475	505
N_2O	70	40	43.5	50	55

[28] Second National Communication (1998), p. p. 84-85.

Other GHG	40	40	42.5	47	52
Total (*and Percentage Projections*)					
Baseline[29]	3,039	2,152	2,330 (77%)	2,710 (89%)	3,150 (104%)
Pessimistic	N/A	N/A	2,280 (75%)	2,570 (85%)	2,910 (96%)
Optimistic			2,260 (74%)	2,520 (83%)	2,790 (92%)

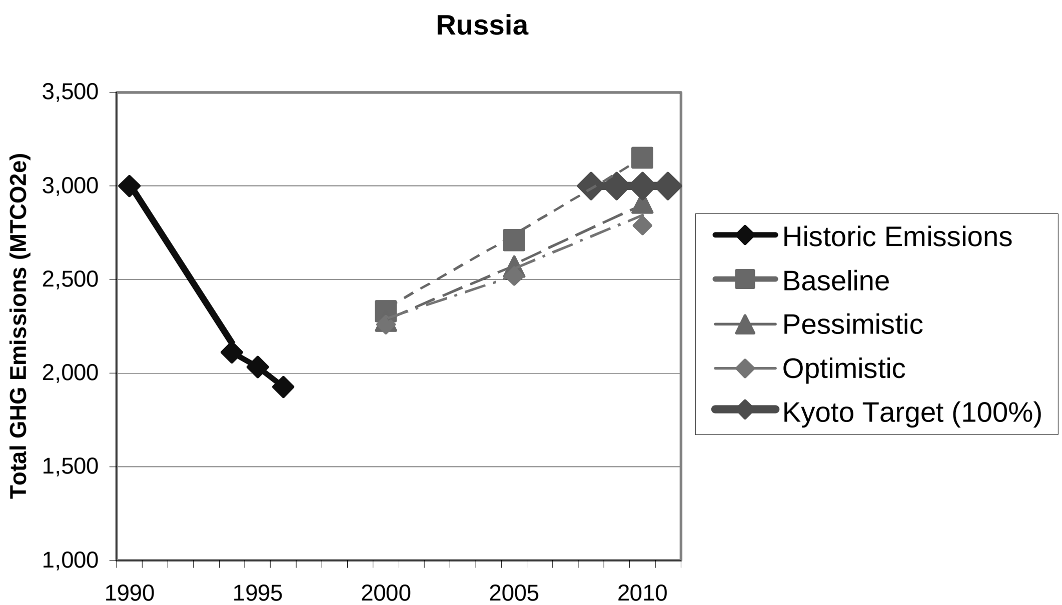
***Source:* Second National Communication (1998), p. 92.**

All CO2 emissions forecasts acknowledge a dramatic uncertainty of economic development as one of the key obstacles to providing reliable estimates. Nevertheless, it appears that only the '*baseline'* scenario would yield the emissions growth that would violate Russia's Kyoto commitment.

At the same time, the Second National Communication indicates that the pessimistic scenario would most likely remain the most realistic reflection of Russian economic development, in which case Russia would be able to sell close to 500 MTCO2e per year by *the end* of the first Kyoto commitment period.

This argument seems to be supported by the data depicted below in the GRID-A/UNEP emissions analysis:

Figure 9.1: Russia: Historical Emissions and Emissions Projections, 1990-2010:



***Source:* EcoSecurities with the UNFCCC data**

***Source:* GRID Arendal, Norway (in cooperation wit the UNEP) for COP-7 in Marrakesh**

In sum, based on the data available for analysis, Russia is likely to remain in the group of ***carbon sellers,*** although the amount of carbon credits available for sale may be smaller than conventionally expected.

[29] Information presented in this table is slightly different from the UNFCCC data shown in Table . 10. 1 (Historical Emissions) because the UNFCCC data do not capture PFCs and other non-CO2-CH4-N20 gases.

III.10 Spain

Table 10.1: Spain, Historical GHG Emissions in MMTCO2e (1990-1999):

.	CO_2	CH_4	N_2O	Total
1990	226.06	34.63	41.24	301.92
1991	233.26	35.21	40.51	308.98
1992	242.28	36.13	39.62	318.03
1993	229.52	36.71	37.17	303.39
1994	242.28	37.69	39.40	319.36
1995	252.96	38.64	38.57	330.17
1996	240.85	40.66	43.24	324.74
1997	264.12	41.87	43.53	349.51
1998	273.02	43.62	43.85	360.48
1999				360.00

***Note**: Complete data for 1999 and 2000 are not available*
***Source**: UNFCCC, greenhouse gas database*

Table 10.2. Spain, Aggregated GHG Emissions, 1990 to 1999, ($MTCO_2$ e), Percentages Relative to the Base Year:

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
100%	102.34%	105.34%	100.49%	105.78%	109.36%	107.56%	115.76%	119.40%	119.24%

***Source**: Calculated from UNFCCC data*

Spain 1990 GHG emissions (base year) were 301.9 MtCO2e. Spain's Kyoto emissions reduction commitment is 8 % relative to base-year, but within the EU "bubble" agreement, Spain is allowed to raise its emissions by 15% with regard to base year, that is 346 MtCO2e per year on average over 2008-2012 period.

As of 1999 Spain emitted 360 MTCO2e per year, corresponding to a net increase of 19.24 % relative to the 1990 emissions levels. Spain was thus in 1999 above its EU "bubble" target.

In the First National Communication GHG emissions, projections are computed for four national energy development scenarios. The definitions of these four scenarios follows the scheme contemplated in the study of the European Union: "European Energy to 2020: a Scenario Approach" and " Energy Scenarios 2020 for European Union"[30]:

- Base scenario – based on the mid-1990s National Plan of Economic Development; the scenario considers in the long term the *most probable* evolution of energy development in Spain based on the national economic and energy forecasts;[31]

- Scenario DEBA – approximates conditions of European economic recession and the Euro-wide energy crisis resulting in political protectionism favoring domestic/indigenous industries;

[30] Produced by the EU General Directorate of Energy (DG-XVII).
[31] Spain's forecasts of the national energy demand were first made in made in 1991 and later reviewed in 1995 considering the new environmental objectives reflected in the National Energy Strategy. The first data available for 1995 suggest in increase of CO2 emissions of energy origin by 9% with respect to 1990 (p. 64).

- Scenario MERA – considers liberalization of the national economy in the absence of public support measures; and

- Scenario MIMA – considers additional energy efficiency measures to bring Spain in compliance with emissions reduction objectives on the global scale.

However, the First National Communication reports only *cumulative* emissions forecasts not differentiating such forecast by the four aforementioned scenarios of energy sector development. [32]

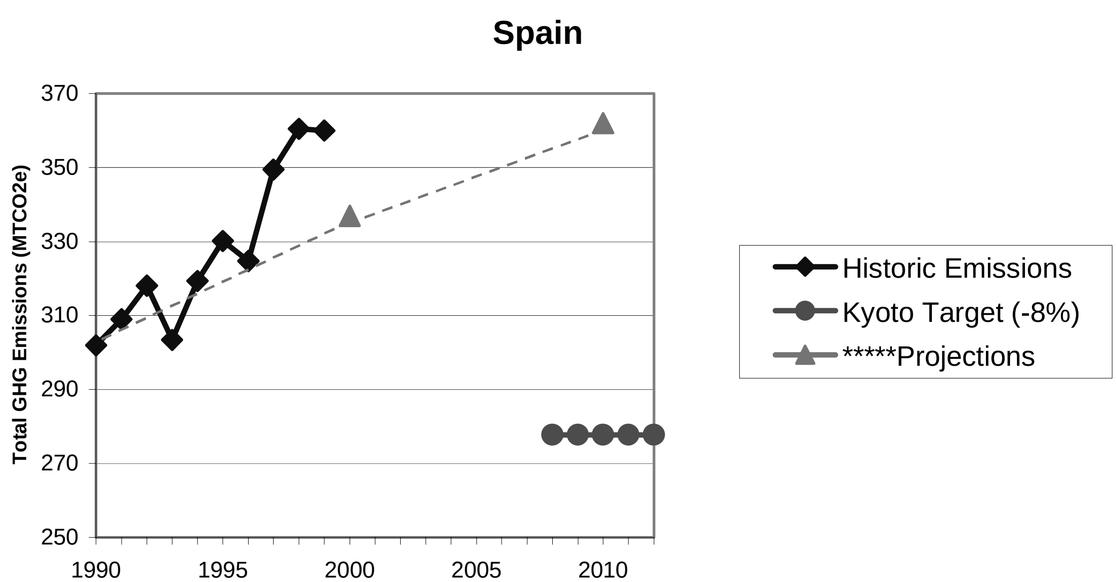
Table 10.3: Spain's GHG Historical Emissions and Emissions Projections, 1990-2010 (MTCO2e):

	1990	2000	2010
CO2	226.42	258.25	282.44
CH4	45.81	49.47	50.39
N20	29.20	29.20	29.20
Total	301.43	336.92	362.03

***Source*: Spain, Second National Communication, p. 64**

According to these emissions projections, Spain would be 19.9 % above 1990 levels in 2010, exceeding its EU 'bubble" commitment. This conclusion is supported by GRID-A projections shown below.

Figure 10.1: Spain: Historical Emissions and Emissions Projections, 1990-2010:



***Source:* EcoSecurities with the UNFCCC data**

[32] The First National Communication states that the reported estimation is partially based on the "present tendencies", which are the function of the actual politics and measures existing in Spain in place i October 1997. However, the numbers shown below do not reflect just the "conventional evolution of the emissions", which implies that forecasts have incorporated all four scenarios of energy sector development. The serious drawback of the First National Communication is the total lack of clear-cut differentiation of emissions forecasts according to the four energy sector development scenarios.

Based on this information, and given the fast pace of Spanish economic growth in the early 2000s, EcoSecurities considers that Spain is likely to join the 'club' of ***carbon buyers*** for the first Kyoto commitment period.

III.11 Ukraine

Table 11.1: Ukraine, Historical GHG Emissions in MMTCO2e (1990-1998):

	CO_2	CH_4	N_2O	Total
1990	703.79	197.45	17.98	919.22
1991	586.48	181.73	15.90	784.11
1992	577.92	175.30	11.87	765.09
1993	504.22	166.58	7.50	678.30
1994	406.84	158.98	6.23	572.05
1995	380.93	153.19	4.71	538.83
1996	346.77	148.25	4.62	499.63
1997	322.91	138.73	4.84	466.47
1998	314.45	135.59	4.90	454.93

Note*: Data for 1999 and 2000 are not available*
Source*: UNFCCC, greenhouse gas database*

Table 11.2. Ukraine, total aggregated greenhouse gases emissions from 1990 to 1999, (MTCO2 e), Percentages relative to the Base Year:

1990	1991	1992	1993	1994	1995	1996	1997	1998
100.00%	85.30%	83.23%	73.79%	62.23%	58.62%	54.35%	50.75%	49.49%

Source*: Calculated from UNFCCC data*

Ukraine Kyoto target is not to exceed on average its 1990 emission level, 919 MtCO2e, over the 2008-2012 period. Ukraine's GHG emissions have steadily declined since 1990. In fact, between 1990 and 1998 Ukraine's emissions have decreased by a total amount of 464 MTCO2e, i.e. a reduction of 51.5 % since 1990.

Deep economic crisis in Ukraine has considerably complicated the assessment of future GHG emissions. In the environment of economic instability, it is indeed extremely difficult to project the terms of economy stabilization, rates of further economic development, speed of technological change and depth of energy efficiency improvements.

The First National Communication (1998) used accounting and iterative equilibrium models to forecast the development of the economy and GHG emissions. Optimization models were applied to develop mitigation scenarios and to estimate mitigation options. All projections are given for three scenarios:

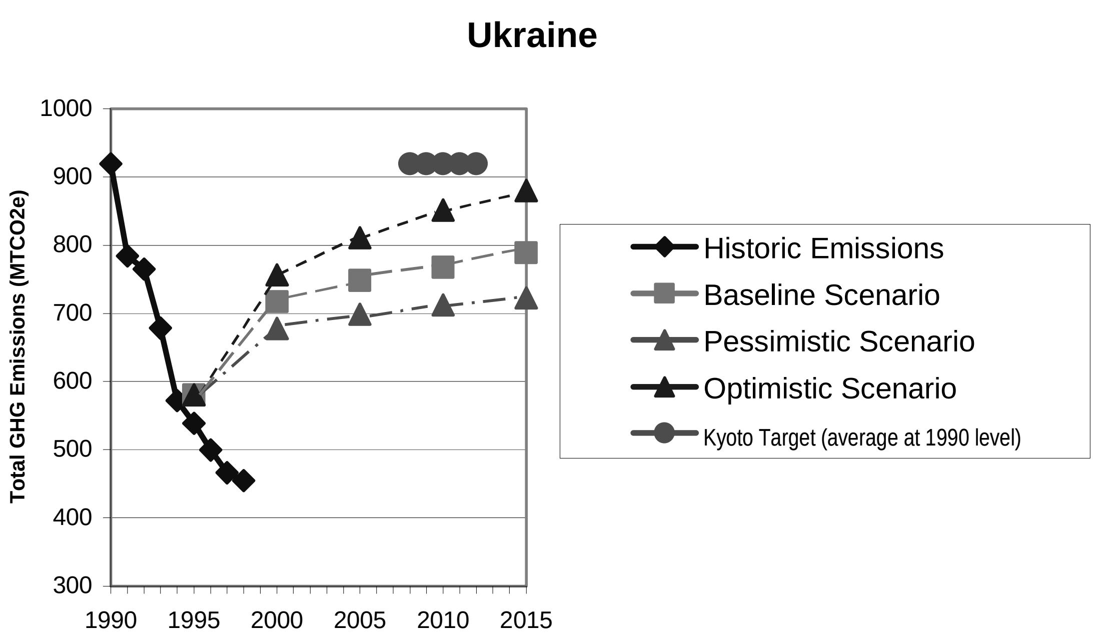
- Baseline;
- Pessimistic (negative rate of economic growth); and
- Optimistic (positive rate of economic growth).

Table 11.3: Ukraine, Emissions Projections: Baseline, Optimistic and Pessimistic Growth Scenarios for 1990-2015 (MTCO2e):

Emissions/year	1990	1995	2000	2005	2010	2015
Baseline Scenario						
CO2	711.45	425.30	530.04	569.15	598.02	634.35
N20	11.85	4.90	10.70	12.19	12.64	13.11
CH4	212.42	150.15	176.04	166.97	156.81	141.50
Total	935.71	580.35	716.78	748.31	767.46	788.96
Pessimistic Scenario						
CO2	711.45	425.30	491.57	520.48	544.04	569.13
N20	11.85	4.90	10.15	11.06	11.49	11.88
CH4	212.42	150.15	176.04	166.97	156.81	141.50
Total	935.71	580.35	677.76	698.51	712.34	722.50
Optimistic Scenario						
CO2	711.447	425.299	569.085	630.634	681.314	724.532
N20	11.8513	4.9042	11.4638	13.0541	13.5811	14.1081
CH4	212.42	150.15	176.04	166.97	156.81	141.50
Total	935.71	580.35	756.59	810.66	851.70	880.14

***Source*: Ukraine First National Communication, p. 35-40**
****The National Communication does not give specific data for the total methane projected in each scenario; thus, the same methane projections are used for all scenarios.***

Figure 11.1: Ukraine: Historical Emissions and Emissions Projections, 1990-2010:



***Source:* EcoSecurities with the UNFCCC data**

All projection scenarios estimate that Ukraine will remain below its base 1990 levels of GHG emissions from 2000 to 2015. The largest increase in GHG emissions is forecast to occur in the Optimistic scenario, but even under this scenario Ukraine remains 4.3 % below 1990 emissions levels. In the '*Baseline*' and '*Pessimistic*' scenarios, Ukraine is well below its Kyoto target with emissions of 14.2 % and 21.4 % below 1990 levels, respectively. If Ukraine's emissions continue to decrease as projected, then Ukraine will be a large-volume carbon seller in the international emissions market.

This assessment concurs with GRIDA projection. As a result of this review, EcoSecurities consider that Ukraine is indeed to become a ***carbon credit seller***.

Appendix IV

Insights on Energy Policies (2001)

Introduction

Market Intelligence Report #1 (June 2001) presented an overview of the dynamics of the Energy sector in North American over period 2000-first quarter of 2001. In the present Appendix we discuss major developments unfolding in the energy sector in Europe within the first eight months of the year 2001 (until September 2001). We stress in particular that most trends affecting the demand for carbon credits can be traced to the market of renewables.

I.1 General Developments at European level

Since the late 1970s European environmental policies have been planned, directed and administered at the level of European Community. In the late 1990s energy and environmental policies have began to merge on the European level under the pressure of the Kyoto agreements. Therefore, in the following sub-section, we elucidate most prominent policy developments initiated at the level of the European Union *before* we proceed to discussing nation-specific energy policies.

I.2 European Renewable Energy Policies: Brief History

The initial steps in the direction of promotion of renewables in Western Europe were characterized by support for Research, Development and Demonstration (RTD&D). This R&D support continues to play an important role, now focusing on several key technologies, such as photovoltaics, ocean tidal power, variety of biofuel combustion techniques and so on. Later, R&D activities were complemented by promotional programs aiming at facilitating the launch of a "critical mass" of renewables for a dynamic market development. Most recently, promotional systems (already applied or under discussion) began emphasizing market elements (competition, fiscal incentives), which indicates further commercialization of renewable energy in the region.

Fiscal support measures, mainly favorable electricity feed-in tariffs and low-interest loans have risen considerably in recent years, becoming considerably more important than "direct" financial support tools, such as grants and subsidies. The ‘support’ share included in payments for renewable electricity injected into the grid, is the major support tool (965 M€ per year).

In the European Commission’s White Paper (1997), annual investments of about 6,8 B€ were programmed so as to reach the target of 12% renewable share in energy supply in 2010.
And in May 2000 the European Parliament proposed a renewable electricity generation target equal to 22.1 % by 2010[1], which *replaced* the original 12%[2].

[1] http://europa.eu.int/abc/doc/off/bull/en/200106/i1013.htm: “Bulletin EU 6-2001: Combating Climate Change”.
[2] Draft Directive of the European Union to Double Renewable Energy Use: http://ens.lycos.com/ens/may2000/2000L-05-10-05.html. Under the new scheme: member states will be able to keep national financial support schemes for at least five years but should eventually adopt a harmonized EU system. Non-binding indicative national targets for renewables will be set to ensure the overall European Union target is met. Member states will have to report annually on their progress, and the Commission will propose mandatory targets if national goals are "inconsistent" with the EU target.

II. European Policies Reducing Carbon-Intensity of European Industry (2001)

II.1 New EU-wide Renewable Energy Directive: Setting up the "Indicative" Renewable Energy Targets for the EU Member-States.

On July 4, 2001 the EU adopted a directive governing the renewable energy sector, which is mentioned in the previous paragraph.[3] As stated above, the Directive is intended to promote the use of renewables in the internal electricity market, with the ultimate goal of increasing the share of renewable electricity from 13.9% to 22% by 2010. More importantly, the Directive sets out a long-term vision of harmonizing support mechanisms for renewable sources.

Currently the EU considers the following renewable energy sources to be covered by the aforementioned target:

- wind;
- solar (both PV and solar thermal);
- geothermal;
- wave energy;
- sea currents;
- tidal and hydroelectric installations with a capacity below 10 MW;
- biomass with insignificant impurities, meaning the biodegradable fraction of materials from agriculture and forestry, wood and cork waste, biodegradable by-products of the pulp and paper industry and the decomposition of the biodegradable fraction of separated municipal wastes; and
- landfill gas**.**[4]

Nuclear energy and large-scale hydropower are excluded from the EU definition of renewables.

One of the most important amendments to the proposed Directive was the extension of the definition of renewable energy sources to include energy produced from incinerating the biodegradable portion of municipal and industrial waste. After months of deliberations, the EU accepted a compromise amendment, which partially integrates the Council's desire to consider incineration of the biodegradable part of municipal or industrial waste as a renewable energy, with the EU Parliament's push to place limits in such practice. The amendment addressing this contentious issue gets around the impasse by demanding that support schemes for renewables under this directive should "respect the waste treatment hierarchy".

Under the waste treatment hierarchy, governments should favor waste prevention and recycling over energy recovery and disposal. "Therefore…", the amendment continues, "…the incineration of non-separated municipal waste should *not* be promoted under a future system for [renewables], if such promotion would undermine the hierarchy."[5]

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[3] http://europa.eu.int/eur-lex/en/com/pdf/2000/en_500PC0884.pdf: "DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL" (On the promotion of electricity from renewable energy sources in the internal electricity market), Brussels, 28.12.2000: Commission of the European Communities.

[4] Ibid., p. 9.

[5] The key words are "non-separated" and "promoted": incinerating the biodegradable component of household waste will be acceptable to the Parliament - contrary to the energy committee's views - but burning unsorted waste will not be actively encouraged. In future, even the organic waste would not necessarily qualify for support.

The directive also sets 'indicative' or non-binding targets for EU member states, although the European Parliament originally wanted binding targets. However, the Directive goes on to provide for a Commission review after four years. Under this scenario, if the Commission is not satisfied at that point with the progress towards meeting the targets, it could propose setting binding targets.

II.2 Regional Renewable Portfolio Standard and Green Certificates Trading

Europeans are actively planning community-wide trading of green certificates. European countries can get involved in the EU-based burden sharing agreement, which takes the form of ‘green certificate’ trading, in order to reduce the costs of meeting national renewable energy obligations.

According to the 2001 study performed by a set of organizations including RISO (Denmark), ECN (Netherlands), Serven (Italy) and ESD (UK), from 2001 until 2010 the total size of green certificate trading in Western Europe is expected to reach 41 billion Euros.[6] The same research reveals that:

- With the EU-wide green certificate trading scheme, in 2010 the equilibrium price of green certificates will be 6.2 Eurocent/kW/h;
- The total production costs of meeting the EU 2010 renewable energy targets are close to 17.6 billion Euros;
- Introduction of green certificate trading induces about 15% in cost saving (or more, depending on a specific target);
- Wind power is considered the main technology permitting the EU to meet its renewable energy targets;
- Without substantial financial support, photovoltaic, wave-power and tidal power are not expected to be cost-effective until 2010;
- It is expected that wind power will contribute close to 28% to meeting the EU renewable electricity target, followed closely by development of biofuels.

So far, the majority of companies in Europe have been selling green electricity for an extra charge of 3 to 4 EuroCents per kWh. Actual or/and proposed price premiums for energy-based green electricity offerings range from 0.4 c/kWh to 5 c/kWh (with a mean of about 2 EUc/kWh in the US).[7] Most suppliers of electricity still invoice the renewable energy environmental benefits separately: put differently, in invoicing practices there continues to be a distinction between the prices charged for power usage and charges for a positive environmental externality ‘green electricity’ provides to energy consumers.

In addition, Europeans are boasting the growing market of renewable certificates trading (“green” certificate trading). Renewable Energy Trading pilot project, connected to promoting green certificates market, was initiated in Europe in January 2001. Companies from 6 countries engaged in the test phase of the Renewable Energy Certificates Program (RECS).

6 “Renewable Energy Burden Sharing” (REBUS project), February-March 2001. Risø National Laboratory (Denmark), Energy Research Center (Netherlands), Energy for Sustainable Development Ltd. (UK) and Servezi Per L’Energia (Italy).

[7] The data are taken from Isabel Kühn, 2000: “ Contribution from Isabel Kühn to World Power 2000”, Centre for European Economic Research (ZEW), Environment and Resource Economics Department (p.4).

The participating states included Denmark, Greece, Italy, the Netherlands, Norway and Sweden.[8]

In a parallel development, Nordic countries have been planning to launch a regional green certificate trading scheme. The original trading was to be launched in Spring 2001, but in June 2001 the Nordic power bourse Nord Pool announced that it would not launch green certificate trade until the mid-2002[9]. "Nord Pool could be ready to do it but other elements are not ready," Nord Pool President Torger Lien told Reuters on the sidelines of the Finnish Electricity Association's 75th anniversary seminar, citing uncertainty over who would issue the certificates and whether they will become mandatory in Nordic countries.

II.3 Synchronization of European Green Taxation

Finally, energy taxes remain a key policy instrument regulating regional energy production and consumption trends. In 2001 Europeans attempted integration of both renewable energy policies and taxation mechanisms – with a variable degree of success.

In April-June 2001 Belgium promised to push for harmonization of energy taxes across the European Union upon assuming the rotating six-month presidency of the bloc. The EU's executive Commission proposed setting minimum EU tax levels on energy products such as coal, gas and electricity in 1997. Minimum taxes on oil derivatives already exist.

However, agreement on an EU-wide energy tax, long under discussion, failed in mid-June when the UK joined Spain in insisting on the liberalization of all EU energy markets before the implementation of an integrated energy tax. Several observers believe that Spanish and British position is designed to put pressure on other EU pivotal member states (such as France and Germany) to liberalize their energy markets, which would lead to the formation of a single EU market for energy.

Belgian and Swedish officials indicated that they will continue to work on an EU-wide energy tax, which is based on energy consumption rather than production. Other elements of the proposed energy tax plan include:

- favorable tax treatment for fuels used in combined heat and power facilities;
- taxation of energy intensive companies under a different set of rules; and
- favorable tax treatment or/and other fiscal support for renewable energy.

No information is available on the Spanish approach to this issue in the early 2002.

III. <u>Private Initiatives: Development/expansion of “green funds”</u>

Investments in renewable energy technology are booming across Europe and North America as ‘green’ fund managers discover the potential of renewable energy industries. Reports released in July 2001 estimate the value the *global* energy technology market at $7 billion and the figure is expected to jump to $82 billion by 2010.

As an institution, "Green funds" are nothing new. Jupiter Asset Management launched their "Ecology Fund" over a decade ago and saw it achieve a growth rate of 73 percent over the past 5 years. What is changing is the increasing number of alternative energy technologies that make up the fund manager's portfolio. For example, Jupiter has recently launched its

[8] The pilot phase represents a voluntary effort, during which certificates are bought and sold from the electricity produced by renewable plants and a certificate issuing body in each country, acting like a central bank, oversees the transfer of certificates among countries.

[9] The timing of the launch of Nordic green certificate trading remains uncertain as of February 2002.

Global Green Investment Trust worth 70 billion pounds. Alternative energy makes up 30 percent of its portfolio.

Among the European institutional investors, the most recent announcement about the launch of a new 'green' fund came from Impax. Impax is celebrating the launch of an investment fund for clean energy, water and waste technology companies, in partnership with the Dutch ASN Bank. This organization is the largest ethical bank in the Netherlands and is a subsidiary of SNS Reeal Group, the fifth largest finance house in the country. The fund is being started with €10m from ASN, and further funds were being sought from the market in June. Impax is advising on the listed companies to be invested in, and anticipates that 50-60% of the fund will buy stakes in renewable energy companies.

Other specifically-European 'green energy' funds that were set/planned in 2000-2001 include:

- Credit Suisse Asset Management (CSAM) has launched a renewable energy fund (Prime New Energy Fund) in March 2000, which has raised Sfr120 million (US$71 million) in the first round of financing. The Fund was initially launched as a private placement;
- In 2000 Credit Lyonnais and Arthur Andersen announced plans for a $400 million fund, which is reported to be aimed at energy infrastructure projects;
- German Umweltkontor has unveiled plans for investment funds to overcome financing bottlenecks that the German renewable developer is experiencing. The company is developing an open fund in the form of a public stock corporation to be operated before the end of 2001. Umweltkotor CEO Heinrich Lohmann claimed that he had already secured 50MW of projects for the fund, including wind farms in Spain and Germany, and a large biomass power plant in Germany; and
- In June 2001 British Columbian energy concerns Ballard Power Systems Inc. and Westcoast Energy Inc., and Netherlands oil producer Royal Dutch/Shell Group announced a launch of a fund to back new energy ventures. The fund, Chrysalix Energy Ltd., will invest in early-stage fuel cell technology. Information on specific size of the fund is not available at this time. Chrysalix is expected to make investments ranging from $200,000 to $4 million.