



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

**BURDEN SHARING AND  
COHESION COUNTRIES IN  
EUROPEAN CLIMATE  
POLICY:  
THE PORTUGUESE EXAMPLE**

**Suraje Dessai  
Axel Michaelowa**

HWWA DISCUSSION PAPER

**89**

Hamburgisches Welt-Wirtschafts-Archiv (HWWA)  
Hamburg Institute of International Economics

**2000**

ISSN 1432-4458

The HWWA is a member of:

- Wissenschaftsgemeinschaft Gottfried Wilhelm Leibniz (WGL)
- Arbeitsgemeinschaft deutscher wirtschaftswissenschaftlicher Forschungsinstitute (ARGE)
- Association d'Instituts Européens de Conjoncture Economique (AIECE)

# **Burden Sharing and Cohesion Countries in European Climate Policy: The Portuguese Example**

**Suraje Dessai**  
**Axel Michaelowa**

This Discussion Paper is part of the HWWA's research programme  
„International Climate Policy“.

Axel Michaelowa has been supported by a grant of the German National Research  
Foundation (DFG) under its Priority Programme „Governance in the European Union“.

Suraje Dessai is grateful to Nuno Lacasta and Andrew Jordan for helpful comments on  
earlier drafts of this paper.

## **HWWA DISCUSSION PAPER**

**Edited by the Department  
WORLD ECONOMY**

Hamburgisches Welt-Wirtschafts-Archiv (HWWA)  
Hamburg Institute of International Economics  
Öffentlichkeitsarbeit  
Neuer Jungfernstieg 21 - 20347 Hamburg  
Telefon: 040/428 34 355  
Telefax: 040/428 34 451  
e-mail: [hwwa@hwwa.de](mailto:hwwa@hwwa.de)  
Internet: <http://www.hwwa.de/>

Axel Michaelowa  
177 Bd. de la République, F-92219 St.-Cloud  
e-mail: [michaelo@easynet.fr](mailto:michaelo@easynet.fr)

Suraje Dessai  
School of Environmental Sciences  
University of East Anglia  
Norwich NR4 7TJ, Großbritannien  
e-mail: [S.Dessai@uea.ac.uk](mailto:S.Dessai@uea.ac.uk)

## Contents

<b>Abstract</b>	<b>6</b>
<b>Zusammenfassung</b>	<b>6</b>
<b>1. INTRODUCTION</b>	<b>9</b>
<b>2. CLIMATE POLICY AND INTEREST GROUPS</b>	<b>9</b>
<b>3. EU CLIMATE POLICY AND COHESION COUNTRIES</b>	<b>11</b>
<b>3.1 Cohesion Member States</b>	<b>13</b>
<b>3.2 The Burden Sharing Agreement</b>	<b>14</b>
<b>4. PORTUGAL'S NATIONAL CONTEXT</b>	<b>16</b>
<b>4.1 Portuguese society</b>	<b>17</b>
<b>4.2 Institutional Framework</b>	<b>18</b>
<b>4.3 Greenhouse gas emissions and projections</b>	<b>19</b>
<b>4.4 Policies and measures</b>	<b>20</b>
<b>5. CONCLUSIONS</b>	<b>22</b>
<b>References</b>	<b>24</b>

## **Abstract**

The EU has been a leader in international climate policy. However, due to activities of interest groups, domestic action, an area which the EU has strongly defended, is proving difficult to carry out, particularly for cohesion member states. Although their behaviour resembles free-riding, at least in an international dimension, Cohesion country targets are actually challenging in the face of their economic boom.

Portugal accepted limiting its GHGs emissions to a 27% increase up to 2010 whereas current projections lead to doubt that Portugal is capable of achieving its target unless more stringent policies are implemented. Underdeveloped institutional capacities and lack of abatement interests accompanied by the rapid economic and road traffic growth are the main causes of the inefficiency of current "quasi-policies".

If Portugal is unable to comply, a consistent EU-wide climate policy is impossible and the risk that the EU as a whole fails to reach its Kyoto targets rises considerably. To reduce this risk, the EU could try to introduce strong enforcement rules and sanctions to prevent member states overshooting their targets. This will be extremely difficult as past efforts to enforce EU regulation have shown. A second way may be to use EU enlargement to enlarge the bubble by the accession countries and thus gain a safety margin. The third and easiest way would be to give the EU Commission the power to buy emission permits from abroad if the target is not reached and reduce EU transfers to those countries that have not reached their target proportionally to their degree of non-attainment. This would open a safety valve while leaving an incentive to countries not to default on their target.

Even if the EU manages to keep its bubble intact, Portugal represents the problem of future high emitters which will be followed by developing countries in the near future. Moreover, Portugal also represents an equity dilemma vis-à-vis developing nations as it will be difficult to ask the latter to limit their emissions when a developed country such as Portugal will have them increased.

## **Zusammenfassung**

Die EU hat bislang eine führende Rolle in der internationalen Klimapolitik eingenommen. Allerdings ist die von der EU betonte Umsetzung heimischer Emissionsverringerrungsmaßnahmen gegen den Widerstand mächtiger Interessengruppen nur

schwer durchsetzbar, insbesondere für Kohäsionsländer. Obwohl die Emissionsziele dieser Länder international eher als Beleg für Freifahrerverhalten gesehen werden, sind sie angesichts des ökonomischen Aufschwungs ehrgeizig.

Portugal akzeptierte die Begrenzung seines Treibhausgaswachstums auf 27% bis 2010. Jedoch zeigen aktuelle Prognosen, dass die Zielerreichung zweifelhaft ist, sofern nicht wirksamere Politiken eingeführt werden. Unterentwickelte Institutionen und das Fehlen von Interessengruppen, die von Emissionsverringern profitieren, gehen mit starkem Wirtschafts- und Verkehrswachstum einher und sind Hauptgrund der Ineffizienz der derzeitigen "Quasi-Politik".

Wenn Portugal sein Ziel nicht erreicht, wird eine konsistente EU-Klimapolitik unmöglich und das Risiko nimmt zu, daß die EU ihr Kyoto-Ziel nicht erreicht. Es könnte durch die Einführung strenger Sanktionen gegenüber Mitgliedsstaaten, die ihre Ziele verfehlen, reduziert werden. Allerdings zeigen Erfahrungen mit der Durchsetzung von EU-Regeln, daß dies mit erheblichen Schwierigkeiten verbunden ist. Eine zweite Möglichkeit ist die Nutzung der EU-Erweiterung zur Erweiterung der Emissionsgemeinschaft, die damit eine Sicherheitsreserve gewinnen würde. Die dritte und einfachste Möglichkeit wäre, der EU-Kommission die Möglichkeit einzuräumen, Emissionsrechte einzukaufen, falls das Ziel nicht erreicht wird. Die Finanzierung würde durch die Reduzierung von EU-Transfers an die Länder erfolgen, die ihr Ziel nicht erreicht haben. Eine derartige, proportionale Transferverringerung würde einen Anreiz schaffen, das Ziel zu erreichen. Selbst wenn die EU-Zielgemeinschaft intakt bleibt, zeigt Portugal das Problem zukünftiger Großemittenten auf, das für Entwicklungsländer relevant werden wird. Darüber hinaus gibt es auch ein Gerechtigkeitsproblem: wie können Entwicklungsländer überzeugt werden, ihre Emissionen zu verringern, wenn selbst Industrieländer wie Portugal sie erhöhen dürfen?





## 1. INTRODUCTION

Increasing scientific evidence has shown that increases in greenhouse gas (GHG) emissions, mainly due to fossil fuel burning and land use change, are gradually but certainly changing the Earth's climate in an unprecedented manner. This evidence forced climate change to enter the political agenda in the early 1990s, becoming an effective part of international politics with the signature of the United Nations Framework Convention on Climate Change (FCCC) in 1992. The EU has played a key role in these international negotiations by the 1990 declaration to stabilise their emissions of CO<sub>2</sub> in 2000 at the 1990 level (Haigh, 1993). An EU-wide energy/carbon tax was to backup the stabilisation strategy, but has not been agreed so far. The EU also pushed the legally binding GHG emission targets of the Kyoto Protocol for industrialised countries. Just before Kyoto, the EU proposed an ambitious 15% cut for three GHGs by the year 2010 compared to 1990 levels (EC, 1997a). At Kyoto, however, it was decided that the EU was to reduce its emissions by 8% for six GHGs. The adoption of Article 4, in the Kyoto Protocol, was fundamental for the perpetuation of the EU "bubble". This article, almost solely implemented for EU purposes, allows Parties with emission reduction commitments to jointly meet those commitments by entering into an agreement that redistributes the total reductions among the parties to the agreement ("burden sharing").

However, on the level of implementation of policy instruments EU performance has been lacklustre which is also the case for domestic climate policies. This is due to the intense and effective involvement of interest groups in the design of EU-wide and domestic policies in contrast to international climate negotiations (Michaelowa, 1998).

## 2. CLIMATE POLICY AND INTEREST GROUPS

The theory of public choice is particularly relevant to climate policy as it touches every economic sector and thus matters to all interest groups in the economy. The array of uncertainties linked to the climate issue allows interest groups to choose divergent positions without being scientifically discredited. Due to the overarching nature of the issue, they can choose from a huge array of instruments<sup>1</sup>.

---

<sup>1</sup> In 1996 the U.N. climate change secretariat listed almost 1000 instruments and measures of climate policy.

National politicians see climate policy as an issue among many others that becomes only relevant if it captures voters' attention, especially after meteorological extremes. Voters become interested in climate policy if urgent local environmental problems have been solved and the general economic situation is good. Thus, the voters in poorer countries will be relatively less interested. Due to the high information costs of voters, politicians will try to develop a bundle of highly visible and easily understandable measures that benefit well-organised lobbies while their costs are distributed as broadly as possible, preferably even shifted into the future or abroad. Generally politicians like to label measures as climate policy that are primarily due to other considerations. They are interested to set basic, easily understandable policy targets that lie in the far future far beyond their term and are not necessarily realistic (Michaelowa, 1998, p. 252).

Business lobbies play a major role in climate policy. Due to complexity and broadness of the issue, politicians, bureaucrats and voters are in need of information that they cannot collect on their own without prohibitive cost. They make up two opposed groups: those losing and those gaining from climate policy.

Lobbies representing emitters' interests will try to keep costs of climate policy as low as possible or even gain additional rents. Thus they will favour subsidies and grandfathered permits while lobbying against taxes or auctioned permits (ERTI, 1994). Another favourite instrument are „voluntary agreements“ that allow to label the autonomous rise in energy efficiency through cost-saving innovation as climate-policy-induced activity (Michaelowa, 1998, p. 253). Regulation is tolerated as long as it is „controlled“ by technological know-how of emitters.

Greenhouse gas emission abatement needs technological know-how. Due to the oil shocks energy savings and renewable energy businesses have sprung up that have set up lobby groups (“abatement lobbies”). These are still rather small but growing rapidly. Environmental NGOs focus on lobbying of the general population and thus concentrate on simple targets or single issues. Bureaucrats favour instruments that allow discretionary decisions, are subject to negotiation and are based on special information needs. This allows them to raise budgets and play a pivotal role in implementation. Thus bureaucrats active in international climate negotiations are interested in “results”, i.e. targets and instruments. Overall, interaction of the different interest groups should lead to the following outcomes:

- Strong international / EU-wide emission targets with a complex set of instruments.
- Strong, non-binding national emission targets supplemented with weaker binding targets. The lower the per capita income the less stringent the target.
- National climate policy programmes tend to contain a big number of visible instruments and measures, many of which are just re-labelled or symbolic.
- Instruments on a national level are inefficient and favour well-organised emitters' and abatement interests. They tend to weigh most heavily on dispersed, non-mobile sectors or shift costs abroad.

### **3. EU CLIMATE POLICY AND COHESION COUNTRIES**

The theory of public choice leads to the hypothesis that national emissions cannot be reduced strongly enough to reach the Kyoto targets, unless there is a „surprise“ that allows to capture „no-regret“ potential. This is politically very explosive as it endangers the reaching of the overall EU target. In this context, we analyse the role of the cohesion countries (Portugal, Spain, Greece and Ireland), which are beneficiaries of structural environmental aid since Maastricht and focus on the particular case of Portugal.

After the Rio Summit a dilemma emerged: Cohesion countries would be allowed to increase their relatively small CO<sub>2</sub> emissions but in this way they could not ratify the Convention unless they could prove that other countries, or the EU as a whole, would compensate for their growing emissions with reductions elsewhere (Vellinga and Grubb, 1993). However, an informal agreement was reached and the EC ratified the Convention in December 1993.

Presently European climate policy is following two main tracks: the burden sharing agreement (BSA) and common and co-ordinated policies and measures (CCPM, for an extensive list see Blok and Merkus (1997)). There were two distinct attempts to negotiate a burden sharing: one in 1997 to bolster the EU negotiating position at Kyoto and the second after Kyoto in 1998 (see Table 1). The latter based on the Kyoto Protocol's „bubbling“ is seen as the EU's first major step towards achieving its Protocol commitments.

**Table 1:**  
**Different EU burden sharing proposals and agreements across time and projected values from the FCCC's National Communications and MARKAL modelling (emission reduction from 1990 values in %)**

Country	National targets for 2000	Original triptique 1997*	Dutch proposal 1997	1997 agreement	UK proposal 1998	1998 agreement	Projected (UN-FCCC)	Projected (MARKAL)
Austria	20 (2005)	1 to 25	25	25	20.5	13	-	-
Belgium	5	12 to 15	15	10	9	7.5	-	+10
Denmark	5	12 to 25	25	25	22.5	21	23	+6
Finland	0	4 to 7	10	0	0	0	+3.5	+30
France	+13	4 to 12	5	0	0	0	0	+2
Germany	25 (2005)	17 to 30	30	25	22.5	21	19	20
Greece	+25	2 to +2	+5	+30	+23	+25	-	+44
Ireland	+20	2 to 5	+15	+15	+11	+13	+17	-
Italy	0	5 to 9	10	7	7	6.5	7	+17
Luxembourg	0	17 to 20	40	30	30	28	40	-
Netherlands	3-5	6 to 9	10	10	8	6	+6	+16
Portugal	+40	+16 to +21	+25	+40	+24	+27	+40	+24
Spain	+25	+6 to +11	+14	+17	+15	+15	+20	+18
Sweden	0	+5 to +26	+5	+5	+5	+4	+10	+13
UK	0	17 to 20	20	10	12	12.5	6	8
<b>EU</b>	<b>0</b>	<b>9 to 17</b>	<b>15</b>	<b>9.2</b>	<b>8.5</b>	<b>8</b>	<b>-</b>	<b>-0.2</b>

\* Range of four variants

Sources: EU Council (1997), Commission (1994), Anonymous (1997, 1998), Gielen et al. (1998), UNFCCC (1998a), Ringius (1999).

CCPM gain further importance as national projections under business-as-usual (see Table 2) show that the BSA targets might not be reached unless stronger policies are taken. However, cohesion countries have been cautious towards the proposal of an EU-wide carbon/energy tax because they believe that the tax would have negative impacts upon their economies (Ikwve and Skea, 1996; Ringius, 1999). Thus the Kyoto's flexible mechanisms (emissions trading, joint implementation and the Clean Development Mechanism) could come into play and the Commission has already acknowledged their important role in meeting commitments at less cost, thereby safeguarding the competitiveness of EU industry (EC, 1998a).

### 3.1 Cohesion Member States

The poorest member states of the EU will be allowed to increase their GHG emissions up to the year 2010 (within the BSA). Portugal, Spain, Greece and Ireland have a per capita GDP which is below 90% of the EU average and are therefore eligible for financial transfers from the cohesion fund which was agreed in the negotiations leading to the Maastricht Treaty (Haigh, 1996; Barrass *et al.*, 1997). Cohesion countries seem to respond with an automatic demand for money and assistance when new commitments are entered into force. EU enlargement will upgrade current cohesion countries from poor to middle ranking (O’Riordan *et al.*, 1999), thus losing benefits to the Eastern bloc, which will become receivers while the formers contributors. Past emissions and efficiency development is shown in Table 2.

**Table 2:**  
**Emissions per unit GDP in the EU (t CO<sub>2</sub>/1000 \$, market exchange rate)**

Country	1986	1988	1990	1992	1994	1996
<b>EU average</b>	<b>0.53</b>	<b>0.50</b>	<b>0.48</b>	<b>0.46</b>	<b>0.44</b>	<b>0.45</b>
% (1990=100)	110	104	100	96	92	94
Average of highest 3 countries*	0.93	0.88	0.88	0.84	0.79	0.72
% (1990=100)	106	100	100	95	90	82
Average of lowest 3 countries*	0.34	0.32	0.31	0.29	0.29	0.30
% (1990=100)	110	103	100	94	94	97
Average of cohesion countries**	0.65	0.64	0.66	0.67	0.65	0.62
% (1990=100)	98	97	100	102	98	94
Portugal	0.55	0.53	0.61	0.67	0.65	0.66
% (1990=100)	90	87	100	110	107	108

\* in the respective year

\*\* Greece, Ireland, Portugal, Spain

Source: IEA (1998), own calculations

As Haigh (1996) pointed out, these countries form a distinct category for climate change purposes within the EU because:

- their per capita CO<sub>2</sub> emissions are relatively low (in an EU context);
- their combined contribution to the EU total of CO<sub>2</sub> emissions is fairly small (about 12%);
- there is a presumption that their relatively low GDP will increase relatively rapidly to achieve the goal of economic convergence.

**Figure 1:**  
**Actual (up to 1997) and projected CO<sub>2</sub> emissions for Cohesion countries and EUR15 for 1990-2000. Actual emissions derived from Eurostat (1997b), IEA (1998) and WEC (1998), projected emissions from European Commission (1998b).**

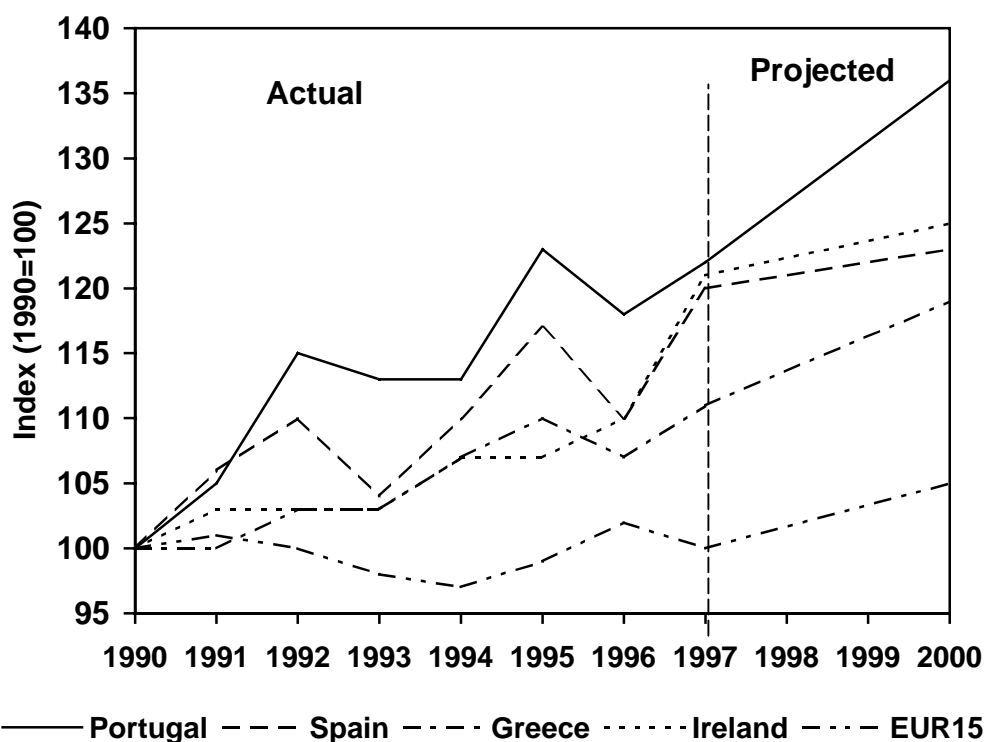


Figure 1 illustrates increases, up to the year 2000, for these countries. Emission levels in these countries depended more on the level of economic growth than on implementation of the measures in their national CO<sub>2</sub> strategies (EC, 1998b).

### 3.2 The Burden Sharing Agreement

The BSA was initially devised in early 1997 using a “triptique approach”, which divides emissions (of CO<sub>2</sub> only) into 3 sectors: domestic, electricity generation and heavy industry (Blok *et al.*, 1997; for a very detailed account of the burden sharing negotiations see Ringius, 1999). Cohesion country concerns were taken into account inasmuch per capita emissions of the domestic sector were assumed to converge by 2030, leaving room for growth until then. Moreover, annual growth of electricity use was set at 1.9% instead of 1% for the other member countries. After Kyoto, with a new set of GHGs and different targets, the burden sharing was revised (see Table 2, Phylipsen *et al.*, 1998), but ultimately the decision was political. Cohesion countries tried to block the strong targets proposed at the beginning of the first BSA negotiations round (second column of Table 1, Ringius, 1999, p. 146) which was taken into account

by the Dutch proposal (third column of Table 1). However, when many member states, also those often perceived as environmental forerunners, wanted their targets to be made less stringent, Portugal and Greece also joined the race despite strong political pressure by the richer member states (Ringius, 1999, p. 151f.). However, Cohesion country negotiators wanted to prevent international criticism and thus accepted despite lack of feedback with interest groups at home. Ringius (1999, p. 156f.) is startled by the lack of negotiation on side payments. However, one can argue that the availability of cohesion funds for abatement acted as a hidden side payment. The 1998 BSA decision was much more unfavourable to the cohesion countries than the 1997 one (see sixth column, Table 1) due to renewed pressure by the rich member states. Several analysts have tried to calculate a fair burden sharing. Gielen et al. (1998) calculated figures for equalising burden per unit of GNP and equalised marginal cost (see Table 3).

**Table 3:**  
**Emission change until 2010 under fair burden sharing rules (%) and ceiling of flexible mechanisms as percent of the reduction need from business-as-usual**

Country	Equal burden per unit GDP	Equal marginal cost	Ceiling (% of reduction from b.a.u.)
Austria	n.a.	n.a.	195
Belgium	1.1	-0.6	76
Denmark	1.2	0.1	248
Finland	18.2	12.1	57
France	-9.7	-8.0	260
Germany	-26.6	-25.8	244
Greece	36.7	26.5	19
Ireland	n.a.	n.a.	136
Italy	8.4	9.6	32
Luxembourg	n.a.	n.a.	54
Netherlands	5.5	3.4	50
Portugal	15.6	9.6	30
Spain	7.3	3.0	108
Sweden	5.8	9.1	46
United Kingdom	-12.0	-10.8	72
<i>Marginal costs</i>	<i>6.5-39, average 18</i>	<i>16</i>	<b>75</b>

Source: Gielen et al. (1998), Betz/Eichhammer (1999)

These figures suggest that the burden sharing worked in favour of the cohesion countries. However, analysis of the actual policy framework as done below throws doubt on this calculation. Dessai (1999) has noted that Spain has already reached its limitation, and is now considering an increase of its nuclear power as a possible remedy



while Portugal is nearly at the edge of its limit. This is due to a marked deterioration of energy efficiency in these countries. Another policy issue that might be detrimental to cohesion countries is the proposed ceiling for the use of the flexible mechanisms. The second formula for acquisition of permits rewards countries with a high difference between Kyoto budget and maximal emissions in the period 1994 to 2002. This does not apply to cohesion countries whose budget is higher than their maximal emissions. Thus those countries with a high business-as-usual growth after 2002 could only use the mechanisms to a much more limited extent than the other member countries. Calculations using projections from the second national communications are shown in the last column of Table 3.

#### **4. PORTUGAL'S NATIONAL CONTEXT**

To illustrate the problems of domestic climate policies in cohesion countries, the particular case of Portugal follows. Located in the west of the Iberian Peninsula, Portugal is a country with a mild climate, small population (9.9 million), and comparatively low per capita GDP. It joined the European Community in 1986, and has been deeply influenced by its policy ever since. Nonetheless, Portugal still has the AEU's lowest GDP and remains both the AEU's and Annex-I (developed countries and those with economies in transition) lowest per capita CO<sub>2</sub> emitter. However, CO<sub>2</sub> emissions per unit GDP have increased considerably in the last years, contrary to the overall EU trend, but also contrary to the average trend in cohesion countries (see Table 1).

Climate change only entered the political agenda in Portugal when the country signed the FCCC in 1992. Up to then, Portuguese involvement in climate policy was solely and passively done through the EU. This member state is heavily dependent on what is done at the EU level, to the extent that any policy adopted by the EU will be carried out by Portugal (Lacasta and Barata, 1997). At the time of the Earth Summit and during the negotiations that lead to the adoption of the FCCC, Portugal had the EU presidency for the first time. Even though the Portuguese delegation was not appropriately prepared (especially in a national context), they were quite successful at the political and diplomatic level (Lacasta and Cavalheiro, 2000). In signing the FCCC, Portugal became responsible, as a developed country, for taking the lead in combating climate change and the adverse effects thereof. However, Portugal behaves almost as a "free-rider", i.e. a country which benefits of carbon abatement by other nations (in this case by richer member states) without bearing the cost of restricting its own emissions. This might seem so, but effectively the 27% increase limitation (within the BSA) is viewed as an

extremely ambitious objective (Barroso and Gonçalves, 1997), which according to Ferreira (1998), will require a considerable effort, more demanding than those of other member states. Worryingly, within the differentiation of the six GHGs, CO<sub>2</sub> gets a 40% increase, but if Portugal has already increased CO<sub>2</sub> emissions by 36% (EC, 1998b), that would allow for an increase of only 4% between 2000 and 2010. At first sight, and bearing in mind the expected development of the Portuguese economy, this target seems highly unrealistic, unless, as Ferreira (1998) pointed out, Portugal starts to import electricity of thermal origin or automobile circulation is progressively banned up to 2010. However, observers from other countries have calculated business-as-usual until 2010 using a MARKAL model to arrive at +40% for CO<sub>2</sub>, -11% for CH<sub>4</sub> and +9% for N<sub>2</sub>O; the full basket gives +24% (Gielen et al., 1998, p. 10, 15).

The change to a six GHG-basket created an additional effort of 15% for Portugal, whereas for most member states it was 1-3%. This high difference for Portugal is caused by the relatively high share of CH<sub>4</sub> and N<sub>2</sub>O in the three-GHG basket (Phylipsen *et al.*, 1998). The application of a heating degree-day correction and the omission of a cooling correction also played against southern countries.

#### **4.1 Portuguese society**

Climate change is not yet perceived by the public in general as a major environmental problem (UNFCCC, 1996), but UNFCCC (1998b) concluded public awareness had a strong influence on the national policy-making process. A study by de Lima *et al.* (1998) showed that half the country has practically no knowledge of environmental issues and only a third of the other half seem to know what the “greenhouse effect” is (climate change is mostly perceived as the greenhouse effect due to the lack of domestic science base). Within the national context, Ribeiro and Rodrigues (1998), even stated that there is no real environmental conscience, but noticed an emergence of environmental awareness in almost every sector of Portuguese society. De Lima *et al.* (1998) also showed that almost two thirds of the Portuguese population are not aware of the meaningfulness of EU integration for Portuguese environmental legislation as well as the environment in general (through cohesion and structural funds). This gives the overall impression that voters will not press for climate policy. As Sormenho-Marques (1998) has noted, Portuguese environmental policy has not been advancing due to civil society demands, but external pressure.

Regarding the impacts of climate change in Portugal, few studies have been performed to date. Detailed impact studies have just started, but it has been shown that the

reduction of March rainfall in Portugal, during the last 30 years, is statistically significant (Zhang *et al.*, 1997; Trigo and DaCamara, 1999), having considerable implications for crop and water management.

Awareness of climate change and its impacts is a prerequisite for a climate policy to be successful (van Beukering and Vellinga, 1996). However in Portugal both are virtually non-existent, thus one of the reasons why Portugal is yet to be galvanised into action.

## **4.2 Institutional Framework**

Ribeiro and Rodrigues (1998) noted that Portuguese institutions are poorly prepared to face the new challenges of sustainable development, and the absence of an institutional Cupertino model, based on interdependence (rather than on hierarchic relationships), further hinders the sustainability transition. Due to the holistic nature of climate change, which is comparable to the sustainability transition, it is noticeable that institutions as far apart as the Ministry of Economy and the Institute of Meteorology have something to say about climate change, but very little integration has ever occurred.

Due to the lack of voters' interests politicians so far have not addressed the issue. The election manifesto of the party currently in power (Partido Socialista, 1995) makes no mention of climate change as an environmental problem, with only a brief remark in energy policy, whilst the Government's Programme (Presidência do Conselho de Ministros, 1995) makes no mention whatsoever. At present, major related priorities are water policy, urban environment, nature conservation and environmental education. Climate policy is only possible as by-product of policies to address these priorities.

In June 1998 an Interministerial Commission on Climate Change (ICCC) was established with the objective, *inter alia*, of elaborating upon a national strategy to be proposed to the Government, provide technical and scientific assistance to national delegations for Conference of the Parties (to the FCCC), and elaborate national reports on climate change. This means that a minimum interest of bureaucrats in the issue exists. It is too soon to assess the ICCC but the Government (Ministério do Equipamento, 1998) has already re-emphasised the need to reinforce the ICCC and develop a national strategy (which currently is non-existent) within the EU framework. O'Riordan and Jordan (1996) defined institutions as the vehicle through which any social change is mediated, and in the process of identifying and responding to threats or requirements for unexpected and unaccustomed Cupertino, institutions themselves change. It is difficult to envisage such a change (at least in short term), as the relative

immaturity of the existing democracy and the still recent political and economic stability (Ribeiro and Rodrigues, 1998) pose a substantial institutional drawback. Yet, UNFCCC (1998b) believes the ICCC will help improve political and institutional co-ordination and strengthen implementation.

### **4.3 Greenhouse gas emissions and projections**

Official inventories on GHG emissions are still only available up to 1994. Portugal almost doubled its emissions in only ten years (from 1985 to 1995). Data differ strongly depending on the source showing a high level of uncertainty. However, estimates of the Second National Communication (PSR, based on data from the Meteorology Institute, Ministry of the Environment, 1997) are supposed to be the most up-to-date, and for consistency, these are used hereafter.

CO<sub>2</sub> emissions are clearly dominated by two sectors, energy and transport, each one comprising about one third of total emissions, with industry accounting for 21%. Waste is by far the largest methane (CH<sub>4</sub>) emitter (more than 70%), followed by agriculture with a quarter of emissions. However, uncertainties are substantial. In the 1997 burden sharing negotiations, CH<sub>4</sub> emission data for 1990 were readjusted upwards by a factor of 4 (!). That adjustment changed the business-as-usual projection by seven percentage points (Gielen et al., 1998, p. 22). More than half the nitrous oxide (N<sub>2</sub>O) emissions originate from agriculture according to PSR. Other estimated GHGs are mainly emitted by the transport sector. It is actually the transport sector which has seen its GHG emissions rise substantially in the last decade.

The transport sector has been steadily increasing its emissions, even in 1993 (recession year) when both energy and industry's emissions dropped considerably. The transport sector actually doubled its emissions from 1985 to 1995 (Eurostat, 1997a), the main responsible being road transports (80% in 1994). The projections presented in PSR seem very inaccurate when compared with the actual trend. The high growth (HG) scenario is based on a high economic development which would increase emissions by 76% in 2010. The business as usual (BAU) scenario would have a 60% increase while the national commitment (NC) scenario would restrict emissions to a 40% increase by 2010 (in accordance with the BSA). These scenarios have assumed a substantial increase in energy consumption on the domestic and services sector (which is in accordance with Moreno *et al.*, 1996) and a decrease in road transports (which is in disagreement with the trend presented in Moreno *et al.*). According to PSR, CH<sub>4</sub> emissions will decrease 11% by 2010 while N<sub>2</sub>O will increase by 5%.

#### 4.4 Policies and measures

As public choice theory would suggest and UNFCCC (1998b) noted, there is no real climate policy in Portugal, merely unconnected policies and partial measures scattered around different sectors with no integration in mind. If at all, policies are implemented due to availability of EU funds – thus costs are shifted abroad. According to PSR, in the agricultural sector, the EU’s Common Agriculture Policy has reduced N<sub>2</sub>O and CH<sub>4</sub> emissions through a less intensive use of agricultural activity. Forestry policy is believed to have reduced CO<sub>2</sub> net emissions by acting as a sink, through afforestation and land use changes (from agriculture to forest).

Among energy policies, significant measures include the introduction of natural gas (since 1997; the government’s major plan to reduce emissions), intensified use of renewable energy resources, improvement of energy efficiency, and use of more sophisticated technologies. Table 4 summarises policies and measures taken by the energy sector and the estimate of their mitigating effects.

**Table 4:**  
**Summary of policies and measures for the energy sector, and their mitigating effect for 2000, 2005 and 2010 (in 1000 tonnes of CO<sub>2</sub>). Adapted from PSR (1997).**

Policy/measure	Type of instrument	Sector	State of implementation	2000	2005	2010
Energy diversification (introduction of natural gas)	Financial incentives; legislation and cooperation	Supply of energy	At implementation stage	3400	5600	11200
Promotion of renewable energies (wind, mini-hydro, geothermal and biomass)	Financial incentives, fiscal incentives and legislation	Production of electricity and use as thermal source	Implemented and legislation approved	600	700	800
Promotion of energy efficiency	Financial incentives and legislation	All sectors of activity	Implemented and legislation approved	500	1000	1200
Total				4500	7300	13200

The introduction of natural gas might reduce CO<sub>2</sub> emissions but on the other hand it might also increase CH<sub>4</sub> emissions (a much more powerful GHG), through leakage from its distribution network (EEA, 1999). In any case, gas use is a “no-regret” policy. The promotion of renewable energy seems to have been greatly neglected, especially solar

energy which has an enormous potential in Portugal. So far, there are no abatement lobbies. This contrasts strongly with neighbouring Spain. Around one third of electricity generation arises from a particular renewable source, hydro energy, which represents 7% of total primary energy supply (TPES) and 90% of renewable energy generation (IEA/OCED, 1996). The only other significant renewable energy source is biomass, which contributes 6% of TPES. However, wind energy has been making remarkable progress recently, rising from 19 MW installed capacity in 1996 to 39 MW in 1997 and 51 MW in 1998 (BTM Consult, 1999). However, the indigenous wind power lobby is still small and most parts are imported.

The main problem for Portuguese climate policy is that Portugal still remains the member state with the lowest energy efficiency (Lacasta and Barata, 1997), which is actually deteriorating due to low energy prices. Primary energy intensity has risen by almost 20% from 1985 to 1996. This is not a phenomenon limited to the industrial sector: Energy use per employee in the service sector has been growing sharply in the first half of the 1990s (Odyssee, 1999). In contrast to Spain which has a strong energy efficiency programme (IEA, 1997, p. 433ff.) in Portugal no co-ordinated policies exist (IEA, 1997, p. 404f.). In the building sector there is talk about a voluntary efficiency rating but no mandatory standard. In the industrial sector since 1982 firms above a threshold of 1000 toe annual energy use have to develop 5-year energy use plans that are to be approved by the Directorate General for Energy with a target of reducing specific energy consumption by 1% per year. Savings achieved in 1998 are estimated at 33 ktoe (IEA, 1999, p. 161). Moreover, the Regional Incentive System for the Rational Use of Energy (SIURE) subsidised energy audits, energy efficiency projects and cogeneration with a total sum of 0.1 million \$ for 1994-1998, yielding 245 ktoe savings (IEA, 1999, p. 162). Apart from that there appear to be no policies or measures relevant for climate change purposes, with the exception of Directive 88/609/CEE, on Major Combustion Installations, fixing reductions for emissions of nitrogen oxides.

Regarding transport policies, PSR makes no mention of the sector that grew 67% over the last 10 years and is the main sector responsible for Portuguese GHG emissions growth. The only present measures that stand out are the control of vehicle emissions through obligatory periodic inspections and the late, but still significant, investment in rail transports, mainly financed through Cohesion funds.

Portuguese climate policy could be improved taking into account the constraints shown by the public choice analysis:

- Bundle competences for climate policy in the Interministerial Commission on Climate Change and allocate it a fixed share of Cohesion funds.
- Start awareness building in the general public.
- Foster environmental NGOs and abatement interest groups.
- Develop a strong programme on energy efficiency using revolving funds to reduce the barriers to “no-regret” options.

## 5. CONCLUSIONS

The EU’s initiative and perseverance have shaped international climate policy. However, due to activities of interest groups, domestic action, an area which the EU has strongly defended, is proving difficult to carry out, particularly for cohesion member states. Although their behaviour resembles free-riding, at least in an international dimension, Cohesion country targets are actually challenging in the face of their economic boom.

Portugal took one of its most ambitious stands ever, in environmental protection, by limiting its GHGs emissions to a 27% increase up to 2010. Current projections do not show that Portugal is capable of achieving its target unless more stringent policies are implemented (UNFCCC, 1998b). The lack of a domestic science base and the underdeveloped institutional capacities and lack of abatement interests accompanied by the rapid economic and road traffic growth are the main causes of the inefficiency of current “quasi-policies”. Additional measures are required if Portugal is not to stay adrift in this battle against climate change.

This Portuguese case study holds several lessons for both European and international environmental policy. First, if Portugal is unable to comply, it will shatter what the EU has been seeking for so long; a consistent environmental policy. If other cohesion countries are in the same circumstances, the risk that the EU as a whole fails to reach its Kyoto targets rises considerably. To reduce this risk, the EU could try to introduce strong enforcement rules and sanctions to prevent member states overshooting their targets. This will be extremely difficult as past efforts to enforce EU regulation have shown. A second way may be to use EU enlargement to enlarge the bubble by the accession countries and thus gain a safety margin. However, this is only possible before the EU ratifies the protocol and would thus have to be negotiated quickly. Moreover, it would give an incentive to reopen the overall burden sharing negotiation. The third and easiest way would be to give the EU Commission the power to buy emission permits from abroad if the target is not reached and reduce EU transfers to those countries that

have not reached their target proportionally to their degree of non-attainment. This would open a safety valve while leaving an incentive to countries not to default on their target. However, the current emphasis of EU negotiators on limiting acquisition of permits would have to be abolished to make this strategy possible.

It is imperative for the EU to show that it can cope with sharing a burden between 15 Parties. Otherwise, the FCCC will have twice the trouble in having Parties achieve their Kyoto commitments. The EU bubble is an excellent laboratory to study problems that will arise with burden sharing in the international arena.

Even if the EU manages to keep its bubble intact, Portugal represents the problem of future high emitters which will be followed by developing countries in the near future. Moreover, Portugal also represents an equity dilemma *vis-à-vis* developing nations as it will be difficult to ask the latter to limit their emissions when a developed country such as Portugal will have them increased.



## References

- Anonymous (1997)  
EU Agrees 2010 Climate Target, ENDS Environment Daily, March 3.
- Anonymous (1998)  
European Union Kyoto Targets, in: *Ecoal*, 26, p. 8.
- Barrass, R.; Sprenger, R.; Triebswetter, U. (1997)  
Cohesion and the Environment: Policy Integration at European Level, *European Environment*, 7, (4).
- Barroso, J.E.; Gonçalves, J. (1997)  
Emissions of Greenhouse Gases and Climate Change, *Ambiente*, (9), 6-10.
- Betz, R.; Eichhammer, W. (1999)  
*Domestic Action and Complementarity of Emission Reduction Through Flexibility Instruments*, ISI Working Paper, Karlsruhe.
- Beukering, P. van; Vellinga, P. (1996)  
Climate change: From science to global policies, in *Environmental policy in an international context: environmental problems as conflicts of interest*, (Eds. P.B. Sloep and A. Blowers) Open University, -The Netherlands, 187-215.
- Blok, K.; Merkus, H. (1997)  
Recent Developments in European Climate Policy, *Change*, (36), 5.
- Blok, K., Phylipsen, G.J.M.; Bode, J.W. (1997)  
*The Tripartite Approach: Burden Differentiation of CO<sub>2</sub> Emission Reduction Among European Union Member States*, Utrecht University, Utrecht.
- BTM Consult (1999)  
*International Wind Energy Development: World Market Update 1998*, Copenhagen.
- Dessai, S. (1999)  
A Critique of the EU Burden Sharing Agreement, *Change*, (47), 13-16.
- European Commission (1994)  
*Evaluation of National Programmes*, COM94/67 final.
- European Commission (1997a)  
*Climate Change – The EU Approach for Kyoto* COM(97) 481 final.
- European Commission (1997b)  
*Energy in Europe: 1997 – Annual energy review*.
- European Commission (1998a)  
*Climate Change – Towards an EU post-Kyoto Strategy*, COM(98) 353.
- European Commission (1998b)  
*Second Communication from the European Community under the UN Framework Convention on Climate Change*.
- European Environment Agency (1999)  
*Overview of National Programmes to Reduce Greenhouse Gas Emissions*, Topic Report 8/99, Copenhagen.
- European Round Table of Industrialists (1994)  
*The Climate Change Debate: Seven Principles for Practical Policies*, Brussels.
- European Union Council (1997)  
*Community Strategy on Climate Change - Council Conclusions*, CONS/ENV/97/1 REV 1, Brussels.

- Eurostat (1997a)  
*Environment Statistics 1996*, Luxembourg.
- Eurostat (1997b)  
*Eurostat Yearbook '97*, Luxembourg.
- Eurostat (1998)  
*Europe's Environment: Statistical Compendium for the Second Assessment*, Luxembourg.
- Ferreira, E. (1998)  
Portugal and the post-Kyoto, in *Diário de Notícias*, (16 January).
- Gielen, D.; Koutstaal, P.; Kram, T.; Rooijen, S. van (1998)  
*Post Kyoto Effects on the Climate Policy of the European Union*, ECN-C-98-040, Petten.
- Haigh, N. (1993)  
EC Implementation: Options and Constraints, in: *Climate Change Policy in the European Community: Report of a Workshop held at the Royal Institute of International Affairs October 1992*, (Eds. P. Vellinga and M. Grubb), Royal Institute of International Affairs, London.
- Haigh, N. (1996)  
Climate Change Policies and Politics in the European Community, in: *Politics of Climate Change: A European Perspective*, (Eds. T. O'Riordan and J. Jäger), Routledge, London, 155-185.
- IEA (1999)  
*Energy Efficiency Policies 1999: Cornerstone for a Sustainable Energy System*, Energy Efficiency Update 22, Paris.
- IEA (1998)  
*CO<sub>2</sub> emissions from fuel combustion 1971-1996, Highlights*, Paris.
- IEA (1997)  
*Energy efficiency initiative, vol. 2. Country profiles and case studies*, Paris.
- IEA/OECD (1996)  
*Energy policies of IEA countries: Portugal 1996 review*, OECD, Paris.
- Ikwve, A.; Skea, J. (1996)  
The energy sector response to European combustion emission regulations, in *Environmental policy in Europe: industry, competition and the policy process*, (Ed. F. Lévêque), Edward Elgar, Cheltenham.
- Lacasta, N. and Barata, P.M. (1997)  
Country Report: Portugal, in *Independent NGO evaluations of national plans for climate change mitigation: OECD countries*, (Ed. Climate Network Europe), 81-84.
- Lacasta, N.; Cavalheiro, G. (2000)  
Um novo clima? Portugal e as Negociações Internacionais sobre Alterações Climáticas, in *Desafios da Globalização e Portugal* (Ed. B.S. Santos), Universidade de Coimbra (in press).
- Lima, A.V. de et al. (1998)  
*Os portugueses e o ambiente: 1º inquérito nacional, versão preliminar e resumida*, Observa, Lisbon.
- Michaelowa, Axel (1998)  
Climate policy and interest groups – a public choice analysis, *Intereconomics*, 33, (6), 251-259.

- Ministério do Equipamento, do Planeamento e da Administração do Território (1998)  
*Portugal: grandes opções do plano 1999*, Lisbon.
- Ministry of the Environment (1997)  
*Portugal's Second Report to be submitted to the Conference of the Parties to the Framework Convention on Climate Change*, Lisbon.
- Moreno, R.A. *et al.* (1996)  
Technologies, policies and measure for mitigating climate change, in *IPCC Technical Paper I*, (Eds. R.T. Watson, M.C. Zinyowera and R.H. Moss), Intergovernmental Panel on Climate Change.
- Odyssee (1999)  
Website <http://www.enerdata.grenet.fr/odyssee/>, accessed Sept. 21.
- O'Riordan, T.; Jordan, A. (1996)  
Social institutions and climate change, in *Politics of climate change: a European perspective*, (Eds. T. O'Riordan and J. Jäger), Routledge, London, 65-105.
- O'Riordan, T.; Jordan, A.; Voisey, H. (1999)  
*The sustainability transition in Europe: current challenges and future prospects*, CSERGE working paper (forthcoming).
- Partido Socialista (1995)  
*Programa eleitoral de governo do PS e da nova maioria*, Lisbon.
- Phylipsen, G.J.M.; Groenenberg, H.; Blok, H. (1998)  
*The EU burden sharing after Kyoto: renewed triptych calculations*, Utrecht University, Utrecht.
- Presidência do Conselho de Ministros (1995)  
*Programa do XIII governo constitucional*, Lisbon.
- Ribeiro, T.; Rodrigues, V. (1998)  
The evolution of sustainable development strategies in Portugal, in *The transition to sustainability: the politics of Agenda 21 in Europe* (Eds. T. O'Riordan and H. Voisey), Earthscan, London, 201-213.
- Ringius, L. (1999)  
Differentiation, leaders and fairness: negotiating climate commitments in the European Community, *International Negotiation*, 4, 133-166.
- Sormenho-Marques, V. (1998)  
*O Future Frágil: Os Desafios da Crise Global Ambiental*, Publicações Europa América, Mem Martins.
- Trigo, R.M.; DaCamara, J.P. (1999)  
Circulation Weather Types and their impact on the precipitation regime in Portugal. *International Journal of Climatology* (submitted).
- UNFCCC (1996)  
*Report on the in-depth review of the national communication of Portugal*. FCCC/IDR.1/POR.
- UNFCCC (1998a)  
*National Communications from Parties included in Annex I to the Convention*. FCCC/CP/1998/11/Addendum 2.
- UNFCCC (1998b)  
*Report on the in-depth review of the national communication of Portugal* (draft). FCCC/IDR.2/POR.

Vellinga, P.; Grubb, M. (1993)

*Climate change policy in the European Community: report of a workshop held at the Royal Institute of International Affairs October 1992*, Royal Institute of International Affairs, London.

World Energy Council (1998)

*The Kyoto Conference and Protocol*, Report No. 8, Update, London

Zhang, X.; Wang, X.L.; Corte-Real, J. (1997)

On the relationships between daily circulation patterns and precipitation in Portugal. *J. Geophys. Res.*, 102, 13495-13507.