



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

*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.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

**Governance and Environmental
Policy Integration in Europe: What
Can We learn from the EU
Emission Trading Scheme?**

Barbara Buchner, Michela Catenacci
and Alessandra Sgobbi

NOTA DI LAVORO 54.2007

MAY 2007

CCMP – Climate Change Modelling and Policy
--

Barbara Buchner, *International Energy Agency*
Michela Catenacci, *Fondazione Eni Enrico Mattei and Università Ca' Foscari, School
for Advanced Studies in Venice Foundation Venice International University*
Alessandra Sgobbi, *Fondazione Eni Enrico Mattei*

This paper can be downloaded without charge at:

The Fondazione Eni Enrico Mattei Note di Lavoro Series Index:
<http://www.feem.it/Feem/Pub/Publications/WPapers/default.htm>

Social Science Research Network Electronic Paper Collection:
<http://ssrn.com/abstract=987458>

The opinions expressed in this paper do not necessarily reflect the position of
Fondazione Eni Enrico Mattei
Corso Magenta, 63, 20123 Milano (I), web site: www.feem.it, e-mail: working.papers@feem.it

Governance and Environmental Policy Integration in Europe: What Can we learn from the EU Emission Trading Scheme?

Summary

The European Union Emission Trading System (EU ETS) is a landmark environmental policy, representing the world's first large-scale greenhouse gas (GHG) trading program. The coexistence of state actors and top-down processes with stakeholders participation and flexible abatement strategies make the EU ETS a powerful instrument of cross sectoral integration of environmental concerns, which benefits from a high level of interaction among the actors involved and a significant degree of information exchange. However, the same peculiarities of the system make it difficult to identify a correspondence with a single mode of governance. The EU ETS shows characteristics of the decision making processes and institutions engaged, the tools and instruments used as well as the actors involved, which change according to the different levels of governance, and belong both to the old and to the new modes of governance. The emission trading scheme represents a clear example of Multi-Level governance, where the different modes of governance interact among them and affect each other.

Keywords: Environmental Policy Integration, Climate Change, Emission Trading, EU Policy

JEL Classification: H23, F53, Q28

Research carried out with partial financial support of the European Community Project EPIGOV (Contract Number 028661(CIT5)). EPIGOV is a research project on the modes of governance employed at global, EU, national and regional/local levels to support the integration of environmental concerns into other policy areas. Relevant policy areas are, for example, transport, agricultural, and energy policy. Running over three years (2006-2009), EPIGOV brings together nineteen research institutions from ten European countries. EPIGOV aims to co-ordinate and synthesise existing research on environmental policy integration and multi-level governance and to generate new research questions and initiatives. To obtain feedback and disseminate results, EPIGOV will also involve policy-makers and non-state stakeholders (<http://www.ecologic.de/projekte/epigov/>). An earlier version of this paper was presented at the first EPIGOV Conference "Better Integration: Mainstreaming Environmental Concerns in European Governance" (Brussels, 15 February 2007). The authors gratefully acknowledge the contributions of participants to the conference.

Address for correspondence:

Michela Catenacci
Fondazione Eni Enrico Mattei
Corso Magenta 63
20123 Milan
Italy
E-mail: michela.catenacci@feem.it

Table of Contents

1.	INTRODUCTION	3
2.	THE EPI CONCEPT	4
3.	DECISION MAKING PROCESSES AND INSTITUTIONS	6
3.1.	The Emission Trading Directive	6
3.2.	The Linking Directive	9
3.3.	Transposition and implementation	10
4.	TOOLS AND INSTRUMENTS.....	12
5.	ACTORS AND NEGOTIATION PROCESSES.....	14
6.	DYNAMIC EVOLUTION OF GOVERNANCE IN THE EU ETS.	17
7.	MODES OF GOVERNANCE.....	21
8.	CONCLUSIONS	22
9.	REFERENCES	25

1. INTRODUCTION

On January 1, 2005, the European Union Emission Trading Scheme (EU ETS) was officially launched, only two years after the European Council adopted the EU Emission Trading Directive (European Community 2003). As a consequence of this formal start, the world's largest ever market in emissions has been established, and European companies across several sectors and industries now face a carbon-constrained reality in form of legally binding emission targets and a price that has to be paid for carbon dioxide (CO₂). Within essentially one year, 2004, the international carbon market has gained momentum through major policy developments and quick market responses, which among others have enabled the establishment of a framework for the EU carbon market.

The EU ETS is by far the largest cap-and-trade system in the world. It covers approximately 11,500 sources and the pre-policy emissions covered total to approximately 2.2 billion tons of CO₂, corresponding to almost half of the CO₂ emissions originating from the EU. The market covers six key industrial sectors, notably electricity and heat production plants greater than 20MW capacity, oil refineries, coke ovens, metal ore and steel installations, cement kilns, glass manufacturing, ceramics manufacturing, and paper, pulp and board mills. The Commission is willing to include other sectors and gases in the post-2012 period. For instance, there is now growing agreement over the need to include aviation in the next trading period (European Commission, 2006b).

This paper analyses the instrument of emissions trading as a possibility to bridge the gap between environmental concerns and barriers against a broad and successful implementation of environmental policy in Europe.

In particular, we want to verify whether the EU Emission Trading Scheme has been able to integrate climate change concerns into the strategies of a wide array of stakeholders and industries. To provide a focussed analysis we firstly introduce the concept of environmental policy integration (EPI) in Section 2. We then discuss the EU ETS under the following three dimensions of governance and environmental policy integration: decision making processes and institutions engaged (Section 3), tools and instruments used (Section 4), and actors involved (Section 5). The dynamic processes that underpinned the development of EU ETS – in particular with reference to the negotiations among different actors and institutions – are presented in Section 6. After identifying the main instruments applied throughout the different phases of definition and implementation of the

Emission Trading system, we relate the scheme to the more widely known modes of governance. In particular, Section 7 analyses the possible relevance of a system of multi-level governance considering the dominant modes of governance for each level and the interactions among them. Finally, in Section 8 we draw first lessons from the EU ETS as a tool to foster environmental policy integration on sectors' strategies and plans, and provide some conclusions for governance and environmental policy integration in general.

2. THE EPI CONCEPT

The EU ETS began operation on January 1, 2005. Even though the scheme faced a number of difficulties in its beginning – as will be discussed in more detail in this and the following sections – it turned out to be an effective tool to limit Greenhouse Gases (GHGs) emissions: the quantitative limit on CO₂ emissions became binding immediately on that date and a real or opportunity cost was imposed on the emissions of virtually all stationary industrial and electricity generating sources within the European Union. Within less than five years, the EU ETS evolved from being an innovative but controversial idea to an indispensable instrument of European climate change policy. The following quote from an observer at Point Carbon, one of the leading data providers and commentators on the EU ETS was typical of early opinion.

“We believe that the chances of having a Community-wide trading scheme in place by 2005 is a low-probability scenario.”

(Point Carbon, September 2001)

This judgment by an insider indicates the difficulties related to the implementation of the EU ETS and makes the achievement even more impressive. The key steps in the process were the development of the Emission Trading (ET) Directive, the addition of the Linking Directive, and the unique EU process of transposition and implementation.

The main purpose of the European ET Directive 2003/87 was to establish a scheme for greenhouse gas emission allowance trading. The system could facilitate compliance to the Kyoto Protocol for the European Annex B parties, by establishing a market to address emission reduction requirements in a few specified sectors (energy activities, production and processing of metal ore, iron and steel, cement, glass and ceramic production, production of pulp, paper and board) referred to as “trading sectors”. According to the Burden Sharing

Agreement of the Kyoto Protocol, each country was given a reduction target to comply with by 2012: the EU ETS established a first warm up phase from 2005 to 2007 and a “compliance phase” from 2008 to 2012 which coincides with the Kyoto Protocol compliance period. The warm up phase of the EU ETS was meant to put Member States on the path to compliance by starting to address the issue of emission reduction early enough to avoid dramatic cuts in the 2008-2012 period, and at the same time gain experience with the new compliance instrument. The EU ETS is a mandatory scheme, which means that all Member States must be a party to it: for new countries, participation in the scheme is a precondition for becoming a party to the European Union itself.

Emission trading allows for the lowest cost reductions, letting countries/installations with high abatement costs buy permits on the market from countries/installations whose abatement costs are much lower. Emission permits in the EU ETS are issued and exchanged in the market among countries, each permit allowing for the emission of 1 tonne of CO₂ equivalent. Allowances in the EU scheme are not printed but held in electronic accounts in registries in each Member State, who is responsible for the transcription of all transfers, cancellations, and surrenders of the permits. In order to link up to the registries system, each Member State must establish a national registry in the form of a standardised electronic database as well as a communication link. A Community Independent Transaction log keeps track of all movements of permits and serves as verification for irregularities.

The first step in creating a market for carbon permits is to establish a volume level: through National Allocation Plans (NAPs), subject to the European Commission’s approval, each Member State has to propose a total number of allowances and the way it plans to allocate them to national installations belonging to the trading sectors for each trading phase, of which 95% during the warm up phase and 90% during every subsequent period must be allocated for free. The allocation plan must respect a list of criteria provided by the European Commission¹; in particular it has to be coherent with the emission reduction target each country must comply with. The administration of the Emission Trading Directive is subject to subsidiarity, which means that each Member State can implement a different plan, for instance allocating the shortage to different sectors, according to their abatement potential, relevance and maturity.

¹ For further details see Annex III, Directive 2003/87/EC.

The characteristics and the results discussed above clearly show the potential of the system to integrate environmental concerns, regarding in this case compliance to the Kyoto Protocol and CO₂ emissions reduction, into sectoral policies. The choice of a market instrument, instead of a command and control policy, was taken with the purpose to internalize the negative externality through the most economically efficient solution. Even though compliance with the EU ETS is mandatory for the identified sectors, the costs of compliance for individual sources are minimised as compared to other instruments of control. The key advantage of emissions trading is that firms can flexibly choose to meet their targets, rather than use predetermined technologies or standards. Emissions sources with low-cost reduction opportunities can over comply and sell their additional allowances to sources where reductions would be more difficult and costly. This leads to the lowest overall cost. Emission trading is particularly relevant to climate change mitigation as carbon dioxide and other GHGs have the same effect wherever they are emitted, but compliance costs differ dramatically across sources. Hence there is considerable scope for trading, and opportunity for considerable gains from these trades.

Many strategic and implementation issues have been solved through an intense debate and a profitable interaction between the Commission, the Member States and the stakeholders, improving the degree of information availability and the capacity of using the results of early actions and consultative processes for policy making process.

3. DECISION MAKING PROCESSES AND INSTITUTIONS

3.1. The Emission Trading Directive

Article 17 of the Kyoto Protocol establishes an International Emissions Trading, and represents the foundation of the European Emission Trading Directive. Indeed, following the signature of the Kyoto Protocol, the European Union found itself in the need for a new comprehensive strategy to meet its Protocol commitments. After having demonstrated its positive position towards market-based instruments already in the 5th EC Environmental Action Programme (European Community 1993), where an introduction of these instruments in environmental policy was suggested, the Commission explicitly recognized in 1998 the possibility to set up a European trading regime by 2005 (European Commission 1998).

The real milestone for emissions trading in Europe occurred in March 2000 with the release of the Green Paper on greenhouse gas emissions trading within the European Union (European Commission 2000). In this document, the Commission proposed emission trading as an instrument that enables cost-effective implementation of the overall target and provides incentives to invest in environmentally sound technologies. The Green Paper was intended to illustrate the key points and functioning of emission trading and to launch the debate within European institutions and stakeholders on the suitability of such a scheme and the way it might operate, emphasizing that such an instrument should start by 2005 in order to allow the European Community and its Member States to gain experience in its implementation before the international emission trading scheme starts in 2008.

The Green Paper was the first important and direct input to the establishment of a European market for CO₂, and the Commission released it simultaneously with a communication on the European Climate Change Programme (ECCP). The ECCP was consequently launched in June 2000, initially focused on the development of further policies and measures in the energy, transport and industry sectors. A number of working groups were set up to consider and give recommendations on the most important options for reducing GHG emissions cost-effectively, amongst them Working Group I on flexible mechanisms. Based on the findings of all working groups, the Commission published in June 2001 an ECCP Report on the potential initiatives for reducing GHG emissions. Following on from this report, in October 2001, the Commission brought forward a package of broad measures to tackle climate change. One of the measures proposed was a framework Directive on GHG emissions trading within the European Community to enable certain businesses and industries to trade their allocations for CO₂ emissions (EC 2001). The draft proposal expected the trading system to start in 2005 and was the result of a long series of informal consultations at the European level.

Still, several issues related to the proposal were unclear, and the opposition from different parts of the European Commission as well as other European Institutions was strong. As a consequence, the final text of the Emission Trading Directive evolved alongside numerous discussions and additional information. This process was initiated by the release of a non-paper on synergies between the proposal and the Integrated Pollution Prevention and Control (IPPC) Directive (EC 2002) as well as a list of replies to frequently asked questions on the

emissions trading proposal², both aimed at clarifying some misunderstanding surrounding the draft proposal.

In October 2002, the first reading of the proposal took place in the European Parliament, and several amendments on the allocation method, opting in, linking to Joint Implementation (JI) and Clean Development Mechanisms (CDM) of the Kyoto Protocol, and sanctions for not compliance were suggested. Following the opinion of the European Parliament, as well as the opinion of the Committee of Regions and the opinion of the Economic and Social Committee, the Commission presented in November 2002 an amended proposal for a GHG trading directive (EC 2002), in which suggested amendments concerning – amongst others – the method and extent of penalties and transparency were accepted.

As a next step, the Council adopted its Common Position on the directive in March 2003³, proposing several amendments to the Parliament's document on the allocation method, opting out, opting in, pooling, linking to JI/CDM, and sanctions. In a communication to the European Parliament, the Commission welcomed the adoption of the common position as it incorporated many of the amendments proposed by the European Parliament. The Commission – who had initially opposed the possibility of auctioning in the first trading phase as requested by the Parliament – also acknowledged that the common position's requirement for Member States during the period 2008-2012 to allocate at least 90% of allowances free of charge gives businesses and Member States greater certainty of what to expect in the future.

Based on the European Parliament's amendments to the Council's common position adopted at the sitting of 2 July 2003, the Council and the European Parliament, in the framework of the co-decision procedure, reached agreement in second reading of the directive. This Council-Parliament agreement gave the green light to the final text of the forthcoming directive, followed by the opinion of the Commission on the European Parliament's amendments (European Community 2003) – where the Commission accepted among others the possibility of auctioning as well as the extension of other greenhouse gases and other installations by Member States from 2008 – and the final adoption by the Council at its meeting of 22 July 2003. The final text of Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a

² Cf. http://ec.europa.eu/environment/climat/pdf/emissions_faq.pdf

³ The text of the Common Position can be found on the Commission's homepage: http://ec.europa.eu/environment/climat/emission/history_en.htm

scheme for GHG emission allowance trading within the Community (European Commission 2003) was thus the result of a long and difficult negotiation among European institutions.

3.2. The Linking Directive

In parallel to the evolution of the Emission Trading Directive, the Commission considered the necessity to adopt a specific provision linking JI and CDM credits to the European trading scheme in order to further exploit the cost-effectiveness of flexible mechanisms. On 23 July 2003, following the final agreement on the Emission Trading Directive, the Commission issued a proposal to amend this Directive with respect to the Kyoto Protocol's project mechanisms, the so-called "Linking Directive" (European Commission 2003). On the same day, also a Commission staff working paper on the extended impact assessment on this proposal was published⁴.

In a next step, the Presidency Conclusions of the Brussels European Council that took place on 16 and 17 October 2003 (Council of the European Union 2003) called for an early approval of the proposal to promote the diffusion of clean technologies as well as to safeguard competitiveness of the European industry. However, at the Environment Council meeting of 27 October 2003 in Luxemburg, ministers of the environment of the EU did not find an agreement on the proposal and decision was postponed. The main reason for the delay was that some of the Member States pushed for the possibility to convert JI/CDM credits into European allowances already in the first trading scheme and not only by 1 January 2008 as indicated in the proposal.

The European Parliament's Committee on the Environment, Public Health and Consumer Policy adopted on 16 March 2004 its report on the proposed directive, suggesting several amendments to the original proposal. In particular, following a report by the European Parliament rapporteur De Roo (European Parliament 2004), the condition of the Kyoto Protocol entering into force to allow the linking was dropped. After a compromise deal, the Council agreed on the text of the Linking Directive, which was then formally adopted by the Parliament on 20 April 2004 at its first reading in Strasbourg.

⁴ "Extended Impact Assessment on the Commission proposal for a Directive amending the Directive establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms SEC(2003)785, Brussels, 23 July 2003", see: <http://www.europa.eu.int/comm/environment/climat/pdf/extendedasses785-3.pdf>

On September 15th, the EU foreign ministers formally adopted the Linking Directive, connecting the EU ETS to the Kyoto Protocol's flexible mechanisms in that it gives firms direct access to credits from project mechanisms as a means of meeting their emission caps. The final text allows firms to have direct access to CDM credits from 2005 and to JI credits from 2008, independently from the entry into force of the Kyoto Protocol. In addition, credits from nuclear projects and from sinks are excluded in the first phase, while hydroelectricity projects must be implemented following international rules. Finally, no formal limitation to the quantity of credits to be included in the European emissions trading scheme is imposed, but Member States must consider the issue of complementarity by the end of 2007 and specify a limit up to which individual installations will be able to use these credits to comply with the emissions trading scheme.

On 13 November 2004, the Directive 2004/101/EC of the European Parliament and of the Council has been published in the EU official journal, and the European Commission has thus met its objective to enable its entry into force before the 1 January, start date for trading in the EU trading scheme.

3.3. Transposition and implementation

Member States needed to transpose the Emission Trading Directive in national law by 31 December 2003. However, the tight deadlines and short time period to get used to the new instrument and to prepare the first national allocation plans made it difficult for Member States to meet this deadline. As a consequence, the Commission sent first written warnings to all EU15 Member States at the beginning of 2004. In July 2004, the Commission issued final warnings to the EU-15, except Austria, France, Germany and Sweden, who had communicated legislation that was being examined by the Commission. In January 2005, the Commission continued legal action against four Member States (Greece, Italy, Belgium, and Finland) for not having fully transposed the Directive into national law.

One of the key requirements of the EU ETS regarded the development of National Allocation Plans for the first trading period (2005-07), which had to be elaborated by the Member States and notified to the Commission by 31 March 2004. The NAPs define the total number of allowances to be created for the period and the distribution of these allowances to individual installations. Only Germany, Austria, Ireland, Finland and Denmark complied with the mentioned deadline, while the Netherlands, Luxembourg, Sweden and UK submitted the

document with a slight delay. From the new Member States, only Latvia, Lithuania, Slovak Republic and Slovenia met their extended deadline (31 May 2004). All the remaining Member States did not submit the final plans in time. In July 2004, the Commission decided to launch infringement procedures against Italy and Greece for being late in submitting their NAPs. In January 2005, Greece finally submitted as the last missing Member State its allocation plan. In June 2005, the Commission accepted this last NAP, completing thereby its assessment of allocation plans for the first trading phase.

Similar delays in transposition were also observed in the final stage of the allocation cycle, the issuance of allowances into an electronic registry account at national level. Indeed, as the EUAs (Emission Unit Allowances) only exist as electronic units, the development of a secure system that tracks the issuing, holdings, transfer and surrendering of allowances is crucial for the functioning of the scheme. Commission Regulation (EC) No 2216/2004 of 21 December 2004 for a standardised and secured system of registries (European Commission 2004) outlines the design of a common backbone system, the Community Independent Transaction Log (CITL), and of individual registries in each European member state linked together by the CITL. In order to link up to the registries system, each Member State was responsible for establishing a national registry that is capable of conducting the functional and technical specifications required by this regulation by 31 December 2004. However, only a few countries met this deadline, impeding the work of major parts of the market as companies in countries without registries were deprived of spot trading. Due to delays in obtaining and assessing NAPs, the Commission decided only in April 2006 to initiate infringement procedures for failure to set up national registries, sending first warning letters to Cyprus, Greece, Luxembourg, Malta and Poland. After a gradual process, the last registry, the Polish one, went online in the beginning of July 2006.

The Linking Directive faced similar difficulties and delays in implementation, which was to be transposed by Member States into national legislation by 13 November 2005. Due to the other tight deadlines and numerous requirements to make the EU ETS start in 2005, the transposition of the Linking Directive into national law proceeded quite slowly. However, delay here was not as immediately important since few CERs were expected to be available before mid-2007.

4. TOOLS AND INSTRUMENTS

The EU ETS is based on the belief that market-based instruments can play a major role in environmental policy. While command and control instruments operate by imposing mandatory obligations on the behaviour of firms and individuals, transferable permits create markets for the pollution externality.

Marketable permits are based on the principle of economic incentives and freedom of choice in the context of the workings of the market. By defining property rights for environmental resources and making them tradable, a market-clearing price emerges as a market for these permits develops, indicating the opportunity cost of emissions. The “cap-and-trade” marketable emission trading scheme starts from the setting of the “cap”, or the total quantity of emissions allowed. The system is constantly monitored and sufficient penalties are applied to sources which emit in excess. It is the exchange process that generates the attractive qualities of the system. In effect, polluters with low costs of abatement will find it relatively easy to abate pollution rather than buy more permits while polluters with higher costs of abatement will acquire permits rather than abating emissions. Thus both parties benefit from the trade and cost minimization behavior will result into the equalization of marginal abatement costs, enabling thus actors to achieve environmental goals at lowest possible costs compared to other policy instruments.

This type of instruments actually has entered the European policy scene quite late, as Europe was traditionally rather advocating command-and-control instruments. The main force behind emissions trading in the context of environmental policy has traditionally been the US, where amongst others important experiences had been made in the context of a SO₂ trading system.

Europe indeed accepted the US request to allow for emissions trading in the Kyoto Protocol only at the final negotiations to avoid a breakdown of the entire climate policy process. Yet, after the US withdrawal from the Kyoto Protocol, ironically this instrument became the primary tool for Europe’s compliance with its obligations under the Kyoto Protocol⁵.

While the EU ETS is clearly motivated by the Kyoto Protocol, and probably would not have been adopted otherwise, it is also curiously independent of the Kyoto Protocol. This is mainly shown by the fact that the ETS is embedded in EU law

⁵ For a deeper analysis of the origins (as well as of the first results) of the EU ETS see Ellerman and Buchner (2007).

and its implementation does not depend on the ratification of the Kyoto Protocol. Finally, as illustrated by the current “post-2012” discussion, the EU ETS is expected to continue beyond 2012 regardless of the fate of the Kyoto Protocol.

The instrument of emissions trading has gained momentum in Europe based on the US precedents. Indeed, there were also some early European experiences with CO₂ emissions trading. The three most important ones were the UK Emissions Trading Scheme (UK ETS), the Danish CO₂ trading program, and the Dutch procurement tenders for JI and CDM credits, ERUPT and CERUPT respectively. All of these are different in important ways from the EU ETS, but they contributed to making emissions trading a less foreign innovation.⁶ In addition, both Sweden and Norway established high-level commissions to examine the feasibility of emissions trading and those commissions recommended emissions trading as the primary means of meeting their targets under the Kyoto Protocol.

While the instrument of emission trading has cautiously become more popular over the last years, at the same time the traditionally used instruments have faced increasingly difficulties on an EU-wide scale. For instance, efforts to get a carbon tax adopted had failed because, as a fiscal matter, it required unanimity in the Council of Ministers. Such an agreement was impossible to obtain; Member States from North to South within the EU had several difficulties with the tax, mainly rising from intense industrial lobbying.

The EU ETS seems to apply different tools for distinct levels of governance. At the EU level, the instruments used for policy formulation and for the implementation phase mainly refer to the so-called “old” mode of governance, and are based on detailed legislation, use of sanctions and setting of legally binding objectives. However at the Member States level the system offers more flexibility, mainly arising from the creation of a market that opens the possibility of voluntary agreement and exchanges among firms and countries.

⁶ The UK ETS, which started in 2001, is a mixed absolute cap and baseline-and-credit system intended to provide experience for firms willing to accept a cap in return for an incentive payment and introduce flexibility into Climate Change Agreements that had been negotiated between industry and the government. The Danish CO₂ trading system, which started in 2002, was limited to the electric utility sector and it included a safety valve feature at a relatively low level (approximately US\$7/tonne CO₂). The Dutch ERUPT/CERUPT programs were solicitations for JI and CDM credits that could be used as Kyoto compliant offsets with a relatively low ceiling price.

5. ACTORS AND NEGOTIATION PROCESSES

The actors involved in the EU Emission Trading scheme show distinctive roles at different levels of governance.

At the international level, the system benefited from the extraordinary strong role of the EU Commission, which assured the unexpected rapidity and the effectiveness of the whole process. The EU ETS is basically a mandatory system, with binding rules, central monitoring and administrative experts.

However, despite the hierarchical character of the system, national control over cap setting gave it fundamental decentralised character compared, for example, to the US SO₂ and NO_x trading system.

Moreover, the Commission realised the importance of stakeholder's consultation and analyses and carried out several consultative processes. Non-state actors, such as stakeholders, firms, industry associations, NGOs, market intermediates etc have been actively involved in the scheme. Yet, the rapidity of the whole process did not leave enough space for these important tools and the Commission is now planning to intensify consultation processes in the future⁷.

Member States play a crucial role in the EU Emission Trading scheme. The total cap of emissions is given by the sum of all the caps set at the national level. Each country is responsible for the transposition and the implementation of the EU ETS Directive, and for the definition of the National Allocation Plans and for the creation of a national registry.

Within the Member States, companies of the six covered industry sectors were closely involved in the set-up of the EU ETS, particularly in the context of the allocation process. In fact, as emphasised in Buchner *et al.* (2007), the allocation process can best be described as an extended dialogue between the government and industry in each country. The reason for this involvement of industry in the process is two-fold: first, as a consequence of the scarce data situation at installation level, the companies were needed in order to provide more detailed information on their emissions data. Second, the Emissions Trading Directive mandated that at least 95% of the allowances in Member States be allocated for free to the covered installations, creating thus a significant value of these endowments. These two factors together created an intense iterative process between the relevant parts of the Member State governments and the affected industry whereby data was collected, cross-checked, and refined at the same

time that distribution proposals were made, evaluated against the data, and modified until a final NAP emerged. This interactive process was a key factor in successfully completing the NAP process.

At the same time, each country had for obvious reasons to face difficult negotiation processes with companies and industry associations, which often claimed that the NAPs could place them in competitive disadvantage. The government had thus a role of a final arbiter, managing a process by which conflicting claims could be resolved. The industry clearly engaged in much lobbying, but the fixed total forced all players into a zero-sum game where a defensive concern about what competitors would receive became as important as offensive attempts to gain more for themselves (Cf. Buchner *et al.* 2007).

However it should be noticed that, while EU industries were almost unanimously critical of the EU carbon or energy tax initiatives, several of them welcomed the idea of emission trading as a central, cost-effective, instrument of climate policy. British Petroleum (BP) started an internal pilot system in September 1998 and Shell followed suit in 2000. Hence, from 1998, industry started to gain an important experience with the ET instrument.

An intense debate among the different actors was brought on both at the national and at the EU levels. For example, due to the complexity and the novelty of the system, many companies within the European Union resulted unprepared for trading and also showed high scepticism with regard to a timely start and well-functioning of the scheme. Conflicting pressures emerged thus between domestic industries and countries' governments, but the main disputes arose during the process of approval of the NAPs by the European Commission.

Indeed, the process of allocating the emission allowances in Europe has attracted world-wide attention given the importance of the allocation process for the overall efficiency of any potential emission trading scheme. EU Member States needed to decide on the amount of GHG emissions allowances (EUAs) to allocate for the period of 2005 to 2007 to large fixed sources of CO₂ - the national allocation plans (NAPs) - by March 2004, and allocation plans for the second phase from 2008 to 2012 are currently under assessment. For obvious reasons, the allocation process has proved to be very difficult. Each country needed to consider a number of criteria simultaneously, mainly determining what proportion of the reduction will come from the sectors under the EU ETS and what from

⁷ COM (2006)676 final.

other sectors (especially transport, buildings and agriculture) and from other mitigation opportunities including the non-CO₂ GHGs sequestration and Kyoto projects allowances. The lack of data at the level of the installation was the biggest problem confronted in the allocation process by nearly all Member States, and it came as surprise to most people since all countries had developed reasonably good inventories of CO₂ emissions data. The reason for the constrained data availability was that the inventory data were developed from statistics of aggregate energy use and they did not extend to the level of the installation, which was the mandated recipient of the allowance allocations by the EU Directive. Given the tight time constraints for submitting NAPs, obtaining installation-level data became the first major hurdle that had to be cleared and the final allocation choices were strongly influenced by considerations of what data could be obtained within the available time. In addition, for both existing and new market participants, the allocation process – both related to the determination of national and sector totals – relied on projections of future energy use and economic activity. As a matter of fact, the use of predictions is very likely to involve some error and to be subject to subtle gaming; but they were unavoidable and helped narrowing the debate and constraining the often expansive claims based on bottom-up estimates. A further difficulty faced by Member States was the treatment of small installations, triggered by the very low level of heat input (20 MW thermal) that the Directive had established as the threshold for inclusion in the ETS. As noted frequently, the inclusion of small installations was not worth it because it required more time and effort than would appear to be justified by their emissions or abatement potential.⁸

The NAP process throughout the EU-25 Member States has been extremely complex and contentious, and intense debates caused delays in the submissions and consequently decisions on the NAPs. Still, given the highly different circumstances of the EU Member States and their equally varying commitments to adopting meaningful measures to restrict CO₂ emissions, the fact that the EU ETS was launched on time and that agreements on the overall allocation could be found is a major achievement. The first phase from 2005 to 2007 is explicitly referred to as a pilot phase, and many decisions have been taken to ensure a timely start of the scheme and to make experiences for the subsequent periods.

⁸ A detailed discussion and analysis of the lessons and general principles to be learnt from the first allocation phase in the EU ETS can be found in Buchner et al. (2007).

In particular, the limited data availability posed a challenge for the allowance allocation. A much-noted by-product of the need to acquire installation-level data for allowance allocation was the resulting significant improvement in the quality of the data on emissions and energy use. Still, until aggregate emission data was released after the first year of the scheme, no one had a really good idea of what aggregate emissions of the covered sectors are, and for this reason – as well as for reasons of creating acceptance across the Member States – the market was characterised by a higher than anticipated supply in the first years, affecting the stringency and consequently carbon price of the scheme.⁹

Notwithstanding all the difficulties, the EU Commission maintained its strong central role throughout the whole process, imposing its rules for allocation and penalizing with warning and legal actions non-complying countries, in order to avoid a watering-down of the EU ETS principles. Signals for the second phase allocations indicate that the Commission aims at a more stringent allocation for the second phase, ensuring thus a viable market. In conclusion, the role of the centre was critical in arriving at the final outcome.¹⁰ Indeed, it is hard to imagine how twenty-five nations could have succeeded in such a multi-national enterprise without the central coordinating role played by the European Commission.

6. DYNAMIC EVOLUTION OF GOVERNANCE IN THE EU ETS

The governance perspective characterising the EU ETS can be analysed as a dynamic process which moves from an initial shaping of the system with the characteristic features of the Open Methods of Coordination (OMC) (see, for instance, Eberlein, Newman 2006), to a binding and structured approach, which leaves nonetheless flexibility at the state level.

⁹ While over-allocation cannot be dismissed as a possibility, a long position is not *per se* evidence of over-allocation, as installations could also have abated in order to sell allowances or to bank them for use in later years. For a preliminary analysis of this issue based on the 2005 data see Ellerman and Buchner (2006).

¹⁰ The Commission acted as agent for the whole in implementing a commonly agreed upon policy, and was as educator and facilitator of the decisions that Member States had to take. In addition, it provided technical competence and political capability generally displayed in supporting the scheme. Of course, there were also problems in the Commission's implementation of the Directive. Specifically, there was widespread criticism of the lack of sufficient guidance on what constituted an installation. The Commission's assessment process has also been criticised as being too 'high level', not transparent enough and not involving enough technical expertise in the sense that decisions on the evaluation of the allocation plans have not always been made by those who were familiar with the technical details of the different countries. For a discussion of the various aspects of the Commission's role see Buchner et al. (2007).

The rationale behind the creation of an emission trading scheme, and the experiences carried out at the international level, in particular the US experience of sulphur dioxide (SO₂) and nitrogen oxide (NO_x) emission trading, showed a dynamic nature, decentralised in its functioning and based on experience sharing and comparison of best practice, rather than on a single legislative framework.

Throughout most of the 1990s, the EU had been the leading sceptic in global climate diplomacy to emissions trading, favouring instead coordinated policies and measures. The EU ETS developed in contrast to command-and-control approaches, and even to the taxation instrument, and its potential for reconciling EU economic and environmental goals encouraged its definition. The system was therefore designed as a flexible mechanism that should help Member States to progress jointly towards the Kyoto target, through horizontal learning processes.

A first “warm-up” phase of the EU ETS (2005 to 2007) was intended to be a pilot phase allowing for ‘learning by doing’. It was commonly accepted that a certain amount of adaptation would be necessary.

Success of the EU ETS depends, inter alia, on simplicity. While all stakeholders agree in principle to strive towards a simple and consistent scheme, there was pressure on governments to grant exemptions and special treatment in national allocations, which tends to increase complexity. An overly complex EU ETS will jeopardise attainment of both environmental and economic objectives, which, namely, are to reach the necessary reductions at the least cost.

However, as an international-wide trading scheme across a range of industries, the EU ETS required the construction of a novel regulatory system. This complex process generated intense debate over near- and long-term economic and political consequences.

The discussion began at the institutional level, right after the issue of the 2000 ET Green paper, which started to enrich the discourse around the EU ETS. The Green Paper outlined several options with regard to the binding nature of the system, including a more flexible “opt-in” clause for the genuinely interested Member States and “opt-out” clauses for certain sectors. It should be noted that, although a mandatory character was envisaged for the system, national control over cap setting gave it a fundamental flexible and decentralised character. Synergies with the 1996 Integrated Pollution Prevention and Control (IPPC) Directive were explored, as was compatibility with the process of liberalizing energy markets. Still, several issues related to the proposal were unclear and the

resistance from different parts of the European Commission as well as other European Institutions was strong. As a consequence, the final text of the Emission Trading Directive evolved alongside numerous discussion and additional information including, among others, amendments on the allocation methods, on penalties and transparency proposed by the European Parliament and by the Council.

Many debates arose also at the Member States level. Several countries, among them such heavy-weights as Germany and the UK, were critical of aspects of the Commission's design. For instance, when the Environment Ministers discussed the trading system further in December 2001, the UK opposed it being mandatory from the outset, and received support from Germany, among others, who was worried that compulsory participation would clash with its national energy efficiency agreements with industry.

Business circles across Europe focussed their criticism on the EU "going it alone" on climate change and imposing costly unilateral measures which do not apply to the EU's major competitors. They argued the system would ultimately lead to delocalisation and job losses with no overall improvement for the environment as the bulk of the world's CO₂ was emitted elsewhere (US, China), and that a global problem such as climate change could not be resolved at EU level but only on a global scale.

Large power companies were pushing for a full use of the Kyoto flexible mechanisms in the EU-ETS. They complained that the current "bureaucratic procedures and restrictive interpretations" imposed too many restrictions on their full-scale use. At the same time, the scheme was accused to place the electricity sector under pressure to make massive investments in order to switch to cleaner production methods (e.g.: from coal to gas-fired power stations), leading to higher electricity prices. Power-intensive industries (e.g.: cement, iron and steel and others) warned that, in the absence of competition in the European electricity market, power companies would be passing on extra costs to industrial consumers. The coalition raised the prospect of an "enormous risk of de-industrialisation" in Europe as a consequence. Moreover, planning and subsequent national reporting requirements imposed on business were often criticised as too burdensome.

Despite these complains about restricted possibilities to adopt the flexible mechanisms electricity suppliers are considered as the major winners of the

introduction of emissions trading. The economist Axel Ockenfels explains in an interview with the *Frankfurter Allgemeine Zeitung*¹¹ that electricity suppliers can, because of the product attributes of electricity, fully include the opportunity costs of using (instead of selling) emissions rights into the calculation of electricity prices. These costs are thus fully conferred to the consumers. It does not matter here that emissions rights are at first distributed for free, because the loss of profit resulting from the use of the rights is independent from the question how these rights were acquired

Environmental groups initially hailed the EU for putting in place its trading scheme and taking global leadership to tackle climate change. But they were disappointed when the 2005 emissions data showed that member states were left with large amounts of unused credits. In addition, most environmental NGOs disapproved the use of CM/JIs, saying they undermined the EU's pledge to cut emissions at home.

The tension was building up and the main risk was to end up in additional and prolonged negotiations. The Commission maintained its strong role throughout the whole decision-making process, to speed up the negotiations and avoid the watering down of the basic ET principles. However it allowed the opening of a first test phase, which let come out many weaknesses and pitfalls of the system. Learning from this experience, a process of review of the scheme for the second round of allocation was carried out.

In a Communication¹² to the EU Council and Parliament, published in November 2006, the Commission analyses how the ETS has worked to date and identifies the need of a review process, with a view of adapting some features of the system for the trading period starting in 2013. The report strongly recommends a broader involvement of stakeholders with a high quality input in the review process. If at the EU level stakeholders could not play a sufficiently representative role in the ETS policy definition phase, mainly because of the rapidity of the process, now the Commission invites interested parties to communicate further views and share practical experience gained in the implementation of the system.

Considering the difficulties in the elaboration and implementation of the NAPs, the Commission regards for further harmonisation of the cap-setting and allocation process. The review will explore the option of a single EU-wide cap and

¹¹ *Frankfurter Allgemeine Zeitung*, 20 April 2006, No. 92, p. 12

that of separate national caps after 2012 determined by each Member State, and will consider specific issues related to auctioning and benchmarking.

At the same time, the Commission underlines the importance of robust compliance and enforcement procedures for the good functioning of the scheme. It will be considered whether the monitoring and reporting guidelines should be laid down in a Regulation in order to aid harmonised application of the legislation.

Some of the options identified in the review would result in a considerable number of additional tasks to be undertaken at the community level to implement the EU ETS after 2012. The institutional arrangements at both Community and Member State level are therefore being adapted to new needs arising out of the review. The result is a more mature scheme, supported by a structured and binding system of rules, targets, monitoring and sanctions, but which maintains its flexible character at the Member States level.

7. MODES OF GOVERNANCE

The peculiar characteristics of the EU ETS make it difficult to relate it to a specific mode of governance. The system shows many aspects belonging to the “old” mode of governance, such as the top-down decision-making process, based on legislation and on state-centric perspective, although not confined to the national level. The implementation of the scheme is subject to processes of monitoring and control, and to the use of sanctions and legal actions. Monitoring and reporting of an installation’s emissions are carried out based on binding EU-wide guidelines, and all self-reported emissions must be verified by an independent third party.

At the same time, the participation of non-state actors played an essential role in policy definition (e.g. during the elaboration of the EU ETS Directive, or the formulation of the NAPs), through processes of bargaining.

Several modes of governance analysed in the literature might have some elements partially matching with the EU ETS characteristics, such as “Framework regulation” (Treib et al. 2005) and “Incorporated transgovernmentalism” (Eberlein, Newmann 2006) modes.

However, the best correspondence between our findings and the modes of governance seems to be the “Competition” mode, identified by Knill (2005), which unifies both hierarchical, legislative based and bottom-up, participatory and

¹² COM(2006)676 final.

flexible modes of governance¹³. In the EU ETS in fact, state-actors are responsible for policy formulation, but are likely to be under strong pressure from commercial non-state actors, who are directly affected by the legislation and will be the main actors of the implementation phase.

The EU ETS represents a clear example of Multi-Level Governance, where different modes of governance are applied at different levels. At the EU level the dominant mode of governance seems to be characterised by regulation and administrative decision-making, under the European Commission leadership. Then, at the national level, the interaction with non-state actors plays a crucial role, assigning more importance to individual decisions and to the use of market instruments during the EU ETS implementation phase. In this way the system results strong and binding, but at the same time it should be more compatible with the different individual countries characteristics and needs.

The different modes of governance interact among them and affect each other. Considering the evolution of the system and the proposals made by the Commission for a review of the ETS, we could identify a kind of “behavioural interaction”.

8. CONCLUSIONS

The timeline of the two directives relevant for the EU ETS highlights the enormous achievement of European climate policy in implementing an efficient method of cross-sectoral integration. Even though the time span between the proposal for the emissions trading scheme and its actual implementation was short, the process that led to the current situation has posed several significant challenges and overcome several barriers. From the initial milestone, the Green Paper that extensively discussed and proposed emissions trading as an idea for Europe, to the actual fundamental role in the European Climate Change Programme (ECCP), the Emission Trading Directive has faced resistance and caused tough debates, involving at the same time state and non-state actors. Given the tight deadlines faced during this difficult negotiation process, the achievement that the EU Emission Trading Scheme now has become the cornerstone of European climate policy is even more outstanding. Within less

¹³ The literature sometimes distinguishes between “new” and “old” modes of governance. The former is traditionally associated with top-down, legislative processes and administrative decision making, while the latter with bargaining, deliberation, and learning in networks (e.g. Börzel, 2006). The terminology is however misleading, as bottom-up, participatory governance is not necessarily more recent than hierarchical, legislative governance.

than five years, the EU ETS has evolved from an innovative idea to an indispensable instrument for Europe's approach to cope with climate change.

Overall, the staged nature of implementation – in the sense that only few Member States were formally ready when the EU ETS started in January 2005 – highlighted that Member State governments were working under tight deadlines and high pressure to set up institutions and pass laws and regulations in preparation for a timely start of the scheme. Given all these additional difficulties and barriers, and particularly the regulatory delays in Member State governments surrounding some NAPs as well as the establishment of national registries, the timely start of the EU-wide emissions trading scheme is even more astonishing.

The multi-level nature of EU ETS governance is characteristic of the EU policy, where central leadership co-exists with decentralised transposition of the legislation and implementation. The EU ETS represents a significant experience of integration of distinct modes of governance, where the old top-down approach to environmental issues is combined with a participatory bottom-up process.

Still, the positive results of the scheme, in terms of timing (rapidity of the process) and of width (number of countries and actors involved) are mainly referable to the strong role of leadership played by the EU Commission throughout the whole process of policy definition and system implementation. The adoption of a detailed legislative framework with binding targets, and the creation of a system of monitoring and sanctions, were indispensable to establish a market in greenhouse gas emissions allowances and ensure its proper functioning and supervision. In this respect, what are often referred to in the literature as “old modes of governance” (Börzel, 2006) – that is, governance systems based on legislative processes, and administrative decision making – have proven not only effective, but also necessary to ensure that new, more participatory, modes of governance could successfully be implemented. Without the strong leadership and commitment of the Commission, bargaining, deliberative decision making and consensus building around the text and details of the EU ETS would never have been possible.

The EU ETS can thus be assessed positively with respect to the process of EPI that it has initiated, encouraging a wide variety of actors – both private and public, at the EU level, national, and regional – to consider climate change in their planning and actions. In spite of the success and spread of the system, however, it is too early to assess its effectiveness in terms of significantly reducing GHGs

emissions. The debate on the real effectiveness of the first “pilot” phase of the EU ETS in terms of emissions reduction, thus, remains open and crucial.

9. REFERENCES

- Börzel, Tanja A. (2006) New Modes of Governance and Enlargement. When Theory Meets Reality, Interim Report, NEWGOV, New Modes of Governance, Free University of Berlin, http://www.eunewgov.org/database/DELIV/D12D04_Interim_Report.pdf.
- Council of the European Union (2003), Presidency Conclusions Brussels European Council 16 and 17 October 2003, 15188/03, POLGEN 77, 23 November.
- Eberlein, Burkard and Newman, Abraham (2006) Innovating EU Governance Modes and the Regulatory Dilemma: The Rise of Incorporated Transgovernmental Networks, unpublished paper presented to the 15th International Conference of Europeanists, Chicago, IL, March 29-April 2.
- Ellerman, A.D. and B.K. Buchner (2007), The European Union Emissions Trading Scheme: Origins, Allocation, and 2005 Results, forthcoming in *Review of Environmental Economics and Policy*.
- Ellerman, A.D. and Buchner, B. (2006), Over-Allocation Or Abatement? A Preliminary Analysis of the EU ETS Based on the 2005 Emissions Data. MIT Joint Program on the Science and Policy of Global Change Report N. 141.
- European Commission (1998), Climate Change – Towards an EU Post-Kyoto Strategy. Communication from the Commission to the Council and the European Parliament. COM (98) 353 final, 3 June.
- European Commission (2000), Green Paper on greenhouse gas emissions trading within the European Union, COM(2000)87, 3 March.
- European Commission (2003), Proposal for a Directive of the European Parliament and of the Council amending the Directive establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto protocol's project mechanisms, COM (2003) 403 final.
- European Commission (2004), Commission Regulation (EC) No 2216/2004 of 21 December 2004 for a standardised and secured system of registries pursuant to Directive 2003/87/EC of the European Parliament and of the Council and Decision 280/2004/EC of the European Parliament and of the Council, OJ L 386, pp. 1 – 77, 29 December.
- European Commission (2006a), Communication from the Commission to the Council and to the European Parliament, the European Economic and Social Committee and the Committee of Regions. Building a global carbon market – Report pursuant to Article 30 of Directive 2003/87/EC, COM(2006)676 final
- European Commission (2006b), Proposal for a Directive of the European Parliament and of the Council on amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community, COM(2006)818 final.
- European Community (1993), Towards Sustainability. A European Community programme of policy and action in relation to the environment and sustainable development, OJ C 138, pp. 5 – 98, 17 May.
- European Community (2003), Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse

gas emission allowance trading within the Community and amending Council Directive 96/61/EC, OJ L 275, pp. 32 – 45, 25 October 2003.

European Parliament (2004), Amendment 1, Draft report (PE 340.779) Alexander De Roo, A scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms, Proposal for a directive (COM(2003) 403 – C5-0355/2003 – 2003/0173(COD) – amending act), PE 340.779/CONS. 1, Committee on the Environment, Public Health and Consumer Policy, 11 March.

Frankfurter Allgemeine Zeitung, 20 April 2006, No. 92, p. 12.

Knill, Christoph and Lenschow, Andrea (2005), Compliance, Communication and Competition: Patterns of EU Environmental Policy Making and Their Impact on Policy Convergence, *European Environment* 15.

Pew Center on Global Climate Change, The European Union Emission Trading Scheme (EU-ETS) Insights and opportunities.

PointCarbon (2001), Towards EU-wide emissions trading? Politics, design and prices, *The Carbon Market Analyst*, 25 September 2001.

Raymond, L. (2003), Private Rights in Public Resources. Equity and Property Allocation in Market-Based Environmental Policy, Washington D.C.: Resources For the Future Press.

Wettestad J. (2005), The Making of the 2003 EU Emission Trading Directive: An Ultra-Quick Process due to Entrepreneurial Proficiency?, *Global Environmental Politics*, the MIT Press

NOTE DI LAVORO DELLA FONDAZIONE ENI ENRICO MATTEI

Fondazione Eni Enrico Mattei Working Paper Series

Our Note di Lavoro are available on the Internet at the following addresses:

<http://www.feem.it/Feem/Pub/Publications/WPapers/default.htm>

<http://www.ssrn.com/link/feem.html>

<http://www.repec.org>

<http://agecon.lib.umn.edu>

<http://www.bepress.com/feem/>

NOTE DI LAVORO PUBLISHED IN 2007

NRM	1.2007	<i>Rinaldo Brau, Alessandro Lanza, and Francesco Pigliaru: <u>How Fast are Small Tourism Countries Growing? The 1980-2003 Evidence</u></i>
PRCG	2.2007	<i>C.V. Fiorio, M. Florio, S. Salini and P. Ferrari: <u>Consumers' Attitudes on Services of General Interest in the EU: Accessibility, Price and Quality 2000-2004</u></i>
PRCG	3.2007	<i>Cesare Dosi and Michele Moretto: <u>Concession Bidding Rules and Investment Time Flexibility</u></i>
IEM	4.2007	<i>Chiara Longo, Matteo Manera, Anil Markandya and Elisa Scarpa: <u>Evaluating the Empirical Performance of Alternative Econometric Models for Oil Price Forecasting</u></i>
PRCG	5.2007	<i>Bernardo Bortolotti, William Megginson and Scott B. Smart: <u>The Rise of Accelerated Seasoned Equity Underwritings</u></i>
CCMP	6.2007	<i>Valentina Bosetti and Massimo Tavoni: <u>Uncertain R&D, Backstop Technology and GHGs Stabilization</u></i>
CCMP	7.2007	<i>Robert Küster, Ingo Ellersdorfer, Ulrich Fahl (lxxx): <u>A CGE-Analysis of Energy Policies Considering Labor Market Imperfections and Technology Specifications</u></i>
CCMP	8.2007	<i>Mònica Serrano (lxxx): <u>The Production and Consumption Accounting Principles as a Guideline for Designing Environmental Tax Policy</u></i>
CCMP	9.2007	<i>Erwin L. Corong (lxxx): <u>Economic and Poverty Impacts of a Voluntary Carbon Reduction for a Small Liberalized Developing Economy: The Case of the Philippines</u></i>
CCMP	10.2007	<i>Valentina Bosetti, Emanuele Massetti, and Massimo Tavoni: <u>The WITCH Model. Structure, Baseline, Solutions</u></i>
SIEV	11.2007	<i>Margherita Turvani, Aline Chiabai, Anna Alberini and Stefania Tonin: <u>Public Policies for Contaminated Site Cleanup: The Opinions of the Italian Public</u></i>
CCMP	12.2007	<i>M. Berrittella, A. Certa, M. Enea and P. Zito: <u>An Analytic Hierarchy Process for The Evaluation of Transport Policies to Reduce Climate Change Impacts</u></i>
NRM	13.2007	<i>Francesco Bosello, Barbara Buchner, Jacopo Crimi, Carlo Giupponi and Andrea Povellato: <u>The Kyoto Protocol and the Effect of Existing and Planned Measures in the Agricultural and Forestry Sector in the EU25</u></i>
NRM	14.2007	<i>Francesco Bosello, Carlo Giupponi and Andrea Povellato: <u>A Review of Recent Studies on Cost Effectiveness of GHG Mitigation Measures in the European Agro-Forestry Sector</u></i>
CCMP	15.2007	<i>Massimo Tavoni, Brent Sohngen, and Valentina Bosetti: <u>Forestry and the Carbon Market Response to Stabilize Climate</u></i>
ETA	16.2007	<i>Erik Ansink and Arjan Ruijs: <u>Climate Change and the Stability of Water Allocation Agreements</u></i>
ETA	17.2007	<i>François Gusdorf and Stéphane Hallegatte: <u>Compact or Spread-Out Cities: Urban Planning, Taxation, and the Vulnerability to Transportation Shocks</u></i>
NRM	18.2007	<i>Giovanni Bella: <u>A Bug's Life: Competition Among Species Towards the Environment</u></i>
IEM	19.2007	<i>Valeria Termini and Laura Cavallo: <u>"Spot, Bilateral and Futures Trading in Electricity Markets. Implications for Stability"</u></i>
ETA	20.2007	<i>Stéphane Hallegatte and Michael Ghil: <u>Endogenous Business Cycles and the Economic Response to Exogenous Shocks</u></i>
CTN	21.2007	<i>Thierry Bréchet, François Gerard and Henry Tulkens: <u>Climate Coalitions: A Theoretical and Computational Appraisal</u></i>
CCMP	22.2007	<i>Claudia Kettner, Angela Köppl, Stefan P. Schleicher and Gregor Thenius: <u>Stringency and Distribution in the EU Emissions Trading Scheme –The 2005 Evidence</u></i>
NRM	23.2007	<i>Hongyu Ding, Arjan Ruijs and Ekko C. van Ierland: <u>Designing a Decision Support System for Marine Reserves Management: An Economic Analysis for the Dutch North Sea</u></i>
CCMP	24.2007	<i>Massimiliano Mazzanti, Anna Montini and Roberto Zoboli: <u>Economic Dynamics, Emission Trends and the EKC Hypothesis New Evidence Using NAMEA and Provincial Panel Data for Italy</u></i>
ETA	25.2007	<i>Joan Canton: <u>Re dealing the Cards: How the Presence of an Eco-Industry Modifies the Political Economy of Environmental Policies</u></i>
ETA	26.2007	<i>Joan Canton: <u>Environmental Taxation and International Eco-Industries</u></i>
CCMP	27.2007	<i>Oscar Cacho and Leslie Lipper (lxxxii): <u>Abatement and Transaction Costs of Carbon-Sink Projects Involving Smallholders</u></i>
CCMP	28.2007	<i>A. Caparrós, E. Cerdá, P. Ovando and P. Campos (lxxxii): <u>Carbon Sequestration with Reforestations and Biodiversity-Scenic Values</u></i>
CCMP	29.2007	<i>Georg E. Kindermann, Michael Obersteiner, Ewald Rametsteiner and Ian McCallum (lxxxii): <u>Predicting the Deforestation-Trend Under Different Carbon-Prices</u></i>

CCMP	30.2007	<i>Raul Ponce-Hernandez (lxxxii): <u>A Modelling Framework for Addressing the Synergies between Global Conventions through Land Use Changes: Carbon Sequestration, Biodiversity Conservation, Prevention of Land Degradation and Food Security in Agricultural and Forested Lands in Developing Countries</u></i>
ETA	31.2007	<i>Michele Moretto and Gianpaolo Rossini: <u>Are Workers' Enterprises Entry Policies Conventional</u></i>
KTHC	32.2007	<i>Giacomo Degli Antoni: <u>Do Social Relations Affect Economic Welfare? A Microeconomic Empirical Analysis</u></i>
CCMP	33.2007	<i>Reyer Gerlagh and Onno Kuik: <u>Carbon Leakage with International Technology Spillovers</u></i>
CCMP	34.2007	<i>Richard S.J. Tol: <u>The Impact of a Carbon Tax on International Tourism</u></i>
CCMP	35.2007	<i>Reyer Gerlagh, Snorre Kverndokk and Knut Einar Rosendahl: <u>Optimal Timing of Environmental Policy: Interaction Between Environmental Taxes and Innovation Externalities</u></i>
SIEV	36.2007	<i>Anna Alberini and Alberto Longo: <u>Valuing the Cultural Monuments of Armenia: Bayesian Updating of Prior Beliefs in Contingent Valuation</u></i>
CCMP	37.2007	<i>Roeland Bracke, Tom Verbeke and Veerle Dejonckheere: <u>What Distinguishes EMAS Participants? An Exploration of Company Characteristics</u></i>
CCMP	38.2007	<i>E. Tzouvelekas, D. Vouvaki and A. Xepapadeas: <u>Total Factor Productivity Growth and the Environment: A Case for Green Growth Accounting</u></i>
CCMP	39.2007	<i>Klaus Keller, Louise I. Miltich, Alexander Robinson and Richard S.J. Tol: <u>How Overconfident are Current Projections of Anthropogenic Carbon Dioxide Emissions?</u></i>
CCMP	40.2007	<i>Massimiliano Mazzanti and Roberto Zoboli: <u>Environmental Efficiency, Emission Trends and Labour Productivity: Trade-Off or Joint Dynamics? Empirical Evidence Using NAMEA Panel Data</u></i>
PRCG	41.2007	<i>Veronica Ronchi: <u>Populism and Neopopulism in Latin America: Clientelism, Trade Union Organisation and Electoral Support in Mexico and Argentina in the '90s</u></i>
PRCG	42.2007	<i>Veronica Ronchi: <u>The Neoliberal Myth in Latin America: The Cases of Mexico and Argentina in the '90s</u></i>
CCMP	43.2007	<i>David Anthoff, Cameron Hepburn and Richard S.J. Tol: <u>Equity Weighting and the Marginal Damage Costs of Climate Change</u></i>
ETA	44.2007	<i>Bouwse R. Dijkstra and Dirk T.G. Rübelke: <u>Group Rewards and Individual Sanctions in Environmental Policy</u></i>
KTHC	45.2007	<i>Benno Torgler: <u>Trust in International Organizations: An Empirical Investigation Focusing on the United Nations</u></i>
CCMP	46.2007	<i>Enrica De Cian, Elisa Lanzi and Roberto Roson: <u>The Impact of Temperature Change on Energy Demand: A Dynamic Panel Analysis</u></i>
CCMP	47.2007	<i>Edwin van der Werf: <u>Production Functions for Climate Policy Modeling: An Empirical Analysis</u></i>
KTHC	48.2007	<i>Francesco Lancia and Giovanni Prarolo: <u>A Politico-Economic Model of Aging, Technology Adoption and Growth</u></i>
NRM	49.2007	<i>Giulia Minoia: <u>Gender Issue and Water Management in the Mediterranean Basin, Middle East and North Africa</u></i>
KTHC	50.2007	<i>Susanna Mancinelli and Massimiliano Mazzanti: <u>SME Performance, Innovation and Networking Evidence on Complementarities for a Local Economic System</u></i>
CCMP	51.2007	<i>Kelly C. de Bruin, Rob B. Dellink and Richard S.J. Tol: <u>AD-DICE: An Implementation of Adaptation in the DICE Mode</u></i>
NRM	52.2007	<i>Frank van Kouwen, Carel Dieperink, Paul P. Schot and Martin J. Wassen: <u>Interactive Problem Structuring with ICZM Stakeholders</u></i>
CCMP	53.2007	<i>Valeria Costantini and Francesco Crespi: <u>Environmental Regulation and the Export Dynamics of Energy Technologies</u></i>
CCMP	54.2007	<i>Barbara Buchner, Michela Catenacci and Alessandra Sgobbi: <u>Governance and Environmental Policy Integration in Europe: What Can We learn from the EU Emission Trading Scheme?</u></i>

(lxxxix) This paper was presented at the EAERE-FEEM-VIU Summer School on "Computable General Equilibrium Modeling in Environmental and Resource Economics", held in Venice from June 25th to July 1st, 2006 and supported by the Marie Curie Series of Conferences "European Summer School in Resource and Environmental Economics".

(lxxxix) This paper was presented at the Workshop on "Climate Mitigation Measures in the Agro-Forestry Sector and Biodiversity Futures", Trieste, 16-17 October 2006 and jointly organised by The Ecological and Environmental Economics - EEE Programme, The Abdus Salam International Centre for Theoretical Physics - ICTP, UNESCO Man and the Biosphere Programme - MAB, and The International Institute for Applied Systems Analysis - IIASA.

2007 SERIES

CCMP	<i>Climate Change Modelling and Policy</i> (Editor: Marzio Galeotti)
SIEV	<i>Sustainability Indicators and Environmental Valuation</i> (Editor: Anil Markandya)
NRM	<i>Natural Resources Management</i> (Editor: Carlo Giupponi)
KTHC	<i>Knowledge, Technology, Human Capital</i> (Editor: Gianmarco Ottaviano)
IEM	<i>International Energy Markets</i> (Editor: Matteo Manera)
CSRM	<i>Corporate Social Responsibility and Sustainable Management</i> (Editor: Giulio Sapelli)
PRCG	<i>Privatisation Regulation Corporate Governance</i> (Editor: Bernardo Bortolotti)
ETA	<i>Economic Theory and Applications</i> (Editor: Carlo Carraro)
CTN	<i>Coalition Theory Network</i>