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European Commission



# A Guide for the European Emissions Trading Scheme



EM<sup>3</sup> - Lab



This publication is one of a series of four Guides that have been delivered under the project titled «**Applying European Emissions Trading & Renewable Energy Support Mechanisms in the Greek Electricity Sector (ETRES)**» with Contract No LIFE03 ENV/GR/000219. The project is co-funded under the European Union's Programme **LIFE-Environment** supported by the Hellenic Ministry for the Environment, Physical Planning and Public Works. Beneficiary of the ETRES project is the Centre for Renewable Energy Sources (**CRES**). Four partners from Greek organizations are directly in the ETRES consortium, namely: the Regulatory Authority for Energy (**RAE**), the **E<sup>3</sup>M Lab** of the National Technical University of Athens (NTUA) and the Greek Association of Renewable Energy Sources Investors (**GARI**). The duration of the project is 30 months, from October 2003 until March 2006. The overall project coordination is managed by Mr Minas Iatridis and Mr Konstantinos Sioulas.

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## LIFE – ENVIRONMENT

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# A Guide for the European Emissions Trading Scheme

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CRES**

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## Foreword

This guide is addressed at Greek industry and their stakeholders and aims to provide information on the European Emissions Trading Scheme (established by Directive 2003/87/EC dated 13th October 2003). The guide will provide a useful introduction for readers who have limited knowledge of the scheme and provide both details and wider context for those who have more experience.

The guide comprises three sections:

- The first section describes how, internationally and nationally, constraints are being placed and incentives being made to mitigate greenhouse gas emissions. The emerging “carbon economy” is briefly described and quantified. The status of greenhouse gas emissions in Greece and national policies for mitigating the growth of emissions in Greece are reviewed.
- The second section presents the European emissions trading scheme. This section draws on Directive 2003/87/EC and other documents published by the European Commission and outlines the rules of the scheme in straightforward terms.
- The third section provides overview analysis and recommendations. There are important uncertainties for Greek companies because the Greek National Allocation Plan (NAP) is not yet published. The Greek NAP will set out CO<sub>2</sub> emissions caps at national, sector and installation levels plus it will determine rules in several areas in which Member States have the discretion to interpret the Directive. Nevertheless, a roughly common approach to the scheme is emerging from other published NAPs, and the scheme will operate from 2005. The guide concludes with recommendations for Greek companies to take proactive steps rather than an uninformed and reactive position.

**Acronyms**

AIJ	Activities Implemented Jointly
AAU	Assigned Amount Unit
CDM	Clean Development Mechanism
CHP	Combined heat and power
CER	Certified Emissions Reduction
CERUPT	Certified Emission Reductions Procurement Tender
CO <sub>2</sub>	Carbon dioxide
COP	Conference of the Parties
EC	European Commission
EB	Executive Board
EIA	Environmental impact assessment
EMAS	EU Eco-Management and Audit Scheme
ERU	Emission Reduction Unit
EU	European Union
EUA	European Union emissions trading Allowance
FDI	Foreign direct investment
GHG	Greenhouse gas
GWh	Giga watt hour
IASB	International Accounting Standards Board
ISO	International Standards Organisation
JI	Joint Implementation
LULUCF	Land use, land use change and forestry
Mt	Mega tonne
MW	Mega watt
NGO	Non-governmental organization
NAP	National Allocation Plan
PCF	Prototype Carbon Fund (World Bank)
RMU	Removal Unit
tCO <sub>2</sub> e	Tonne of carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
QMS	Quality Management System

## Why worry about climate change?

The capture of heat energy by water vapour, carbon dioxide and other gases in the atmosphere is a natural process – indeed, it enables the Earth to maintain a suitable temperature for life. However, human activities are adding increasing quantities of greenhouse gases (GHGs) to the atmosphere, thus causing more energy to be stored. There is strong scientific consensus that this is leading to increases in average global temperatures that may drive major changes in the climate system. Although the Earth's climate fluctuates naturally (such as in the ice ages), changes are now faster than any natural process and unprecedented impacts are expected.

### **Higher temperatures and changes in rainfall patterns affecting natural and human systems will cause severe impacts such as:**

- **reduced food security;**
- **loss of life due to catastrophic floods;**
- **submergence of land by rises in the sea level;**
- **increased spread of diseases such as malaria.**

Countries and groups with least resources have least capacity to adapt and are the most vulnerable.

Climate modeling predicts considerable climate change in the Mediterranean region. Modeling indicates considerable increases in summer temperatures and smaller increases in winter. Predicted changes in rainfall are uncertain but many models predict very significant decline in summer precipitation over the Mediterranean region as a whole, including Greece, with some increase in the winter for more northerly areas, including northern Greece. Greece is located in a transition area between the temperate and subtropical climatic systems, and its prevailing climate could change dramatically if these systems shift either slightly north or south. Increased drought is a key risk for Greece (National Observatory of Athens, 2001).

There are six GHGs; carbon dioxide has the most impact (~70%), followed by methane (~20%) and nitrous oxide (6–7%). GHG emissions result from a range of human activities, including:

- burning fossil fuels
- industrial processes
- transport
- agriculture
- deforestation.

Tackling climate change requires the “mitigation” of GHGs, ie. reducing emissions and promoting their increased absorption by vegetation through forestry and land use changes (such as different agricultural practices). This will require changes to fundamental activities throughout all sectors of the global economy including energy, transport, land use, etc. Because GHGs mix in the Earth's atmosphere, neither the source of emissions nor how and where emissions are reduced matters. This underlies the justification for international co-operation.

## An overview of the carbon economy

**The predicted widespread and severe impacts of climate change has led to a range of international and national initiatives to promote GHG mitigation by developing a “carbon-constrained economy”.**

The international community first acknowledged climate change as an important global issue in 1992 with the adoption of the United Nations Framework Convention on Climate Change (UNFCCC). Legislation and “market mechanisms” have since been developed to bring GHG mitigation into the global economy. These measures have potentially far reaching impacts on the global economy and their development has inevitably involved intense debate on major political, economic and technical issues. The development process – and the debate – continues.

A landmark in this process was the Kyoto Protocol, which was adopted by the international community in 1997. This contains legally binding emission targets for the developed countries (termed Annex I Parties). At Kyoto, developed countries committed themselves to reduce their overall emissions of six GHGs by at least 5% below 1990 levels over the period 2008 to 2012. This is known as the first commitment period. Specific country targets were also agreed.

The European Union Emissions Trading Scheme (EU ETS) is separate but linked to the Kyoto Protocol and the EU scheme will start to operate from 1st January 2005 irrespective of whether the Protocol is ratified. When the Protocol enters into force, there will be legally binding targets for participating developed countries around the world. At the time of writing (October 2004) 36 developed countries had ratified. With the withdrawal of the US from the Protocol in 2001, entry into force has depended upon ratification by Russia. At the time of writing it was reported that the Russian cabinet has approved the Kyoto Protocol and sent it to the Duma (Russian parliament) for ratification. Observers consider this a major step forward in the emerging global carbon market.

**All GHGs are equated to carbon dioxide (CO<sub>2</sub>) according to their relative impact and the commodity in the carbon-constrained economy is tonnes of CO<sub>2</sub> equivalent (tCO<sub>2</sub>e).**

**The two facets of the market are:**

- **project-based emission reduction transactions, in which a buyer purchases ex-post (ex-post is after the event: ex-ante is before the event) verified emissions reductions (ERs) from a project which reduces GHG emissions compared to a baseline of what would have happened otherwise**
- **cap-and-trade regimes under which there is ex-ante allocation of GHG allowances to covered installations.**

There are many terms used for tonnes of CO<sub>2</sub> equivalent according to the way that they originate. This guide focuses on European Emission Allowances (EAUs) which are created under the EU Trading Scheme. The generic term tonnes CO<sub>2</sub>e is used to refer to all types of transaction.



## Does the carbon economy exist?

According to the World Bank (June 2004), there was a total of 78 million tCO<sub>2</sub>e traded during the year 2003 with total market value around US\$330m (€285m). The market has grown rapidly in 2004, with 64 million tonnes traded by the end of May 2004 with value about US\$260m (€225m). Significantly, the World Bank reports signs of growing liquidity such as new projects and players coming into the market and the start of secondary transactions.

To explore this further, the different components of the market need to be considered. The two main facets of the market, project-based and allowances, can be divided further and the World Bank considers the following segments:

- The Kyoto Protocol project mechanisms
- The Kyoto Protocol emissions trading scheme
- The EU Emissions Trading Scheme
- National cap-and-trade schemes, e.g. the currently operating UK scheme, forthcoming schemes in Canada and Norway
- Regional schemes, e.g. regulations within USA and Australian states
- Voluntary markets, e.g. Chicago Climate Exchange
- Retail markets serving domestic or small-scale buyers

The vast majority of the market by volume has been project-based transactions intended for compliance with the Kyoto Protocol. Allowances have only accounted for a very small fraction of the market – three per cent in 2004. However, these are expected to grow with the EU ETS starting in 2005 and other schemes becoming operational in Canada and elsewhere. Trade in EU Allowances (EUAs) is growing rapidly as the start date approaches (see accrual trading of allowances to date section).

Prices are much more complex than volume data. Prices vary according to the source of the tonnes CO<sub>2</sub>e – the segment of the market and country. There is huge variation in the structure and conditions of contracts under which tonnes CO<sub>2</sub>e are transacted and these impact upon price. Price may also depend upon the vintage, or year in the future, to which the tonnes CO<sub>2</sub>e relate. Some further information on prices is given in the accrual trading of allowances to date section.

Demand has been primarily from two buyers in the last 3-4 years namely the World Bank Carbon Finance Business and the Government of the Netherlands. During 2004, Japanese companies have emerged as the single largest group of buyers. This is evidence of how the market is maturing. Governments and the World Bank have provided initial impetus in the market by buying directly. Governments are now placing the onus onto the private sector through schemes and regulations. Japanese companies are buying in anticipation that they will need tCO<sub>2</sub>e to meet forthcoming regulations and they believe prices paid now will be less than prices they may have to pay in the future.

On the supply side, five countries (India, Brazil, Chile, Indonesia and Romania) have been the source of two thirds in terms of volume. The main types of project have been similar in 2003 and 2004 and are:

- renewable energy: biomass, wind, hydro and landfill gas
- energy efficiency
- fuel switching
- HFC<sub>23</sub> destruction
- land use and forestry
- geological sequestration

Renewable energy projects have been dominant, accounting for 63% of volume contracted in 2003 and 49% of the volume contracted in 2004 (from January to May). Other project types have accounted for between 4% and 10% of volume during these two years. Market share of HFC<sub>23</sub> destruction projects has grown substantially and accounts for 31% in 2004.

**The global carbon market exists and it is growing - its market value will approach €0.5 billion in 2004.**

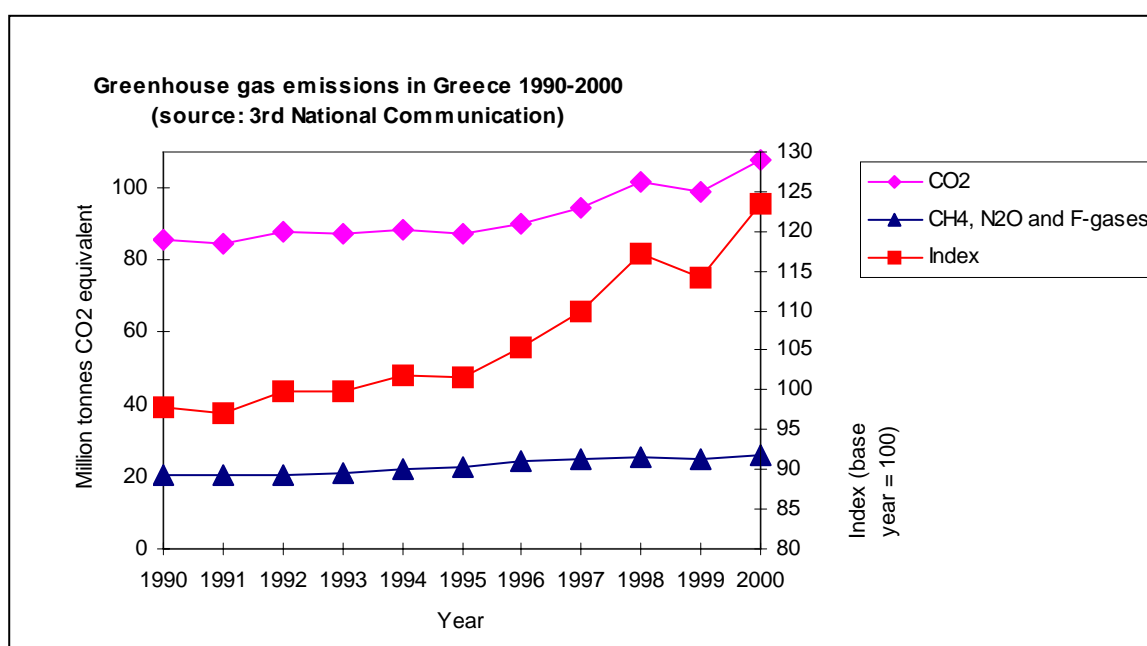
The market is at early stages and further important steps will need to be taken before true constraints on GHG emissions are in place. Some of the issues pertinent to the EU ETS are discussed – see Status of National Allocation Plans section.

## Greenhouse gas emissions in Greece and their mitigation

Greenhouse gas emissions are growing steadily in Greece and are directly in line with the growth in economic activity (measured by Gross Domestic Product) and energy use (Gross Inland Consumption). This section outlines data on emissions and their main sources, reviews the targets, plans and measures in place to reduce the rate of growth of emissions, and considers what the situation may be in the future.

The National Observatory of Athens delivers regular inventories of gaseous emissions in Greece. The inventories consider the emissions of all six gases covered by the Kyoto Protocol (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O and fluorinated gases or F-gases) by the major economic sectors. The 3rd National Communication to the UNFCCC (Ministry for the Environment, Physical Planning and Public Works, 2002) includes inventory data to the year 2000. Emissions in Greece are illustrated with extracts from this data presented in the tables and graphs below.

Emissions of all greenhouse gases grew substantially in the period 1990 to 2000, increasing from 106.1 mtCO<sub>2</sub>e in 1990 to 133.8 mtCO<sub>2</sub>e in 2000. There is a clear upward trend with some annual variation, for example high incidence of forest fires in the year 2000 gave higher emissions in that year.

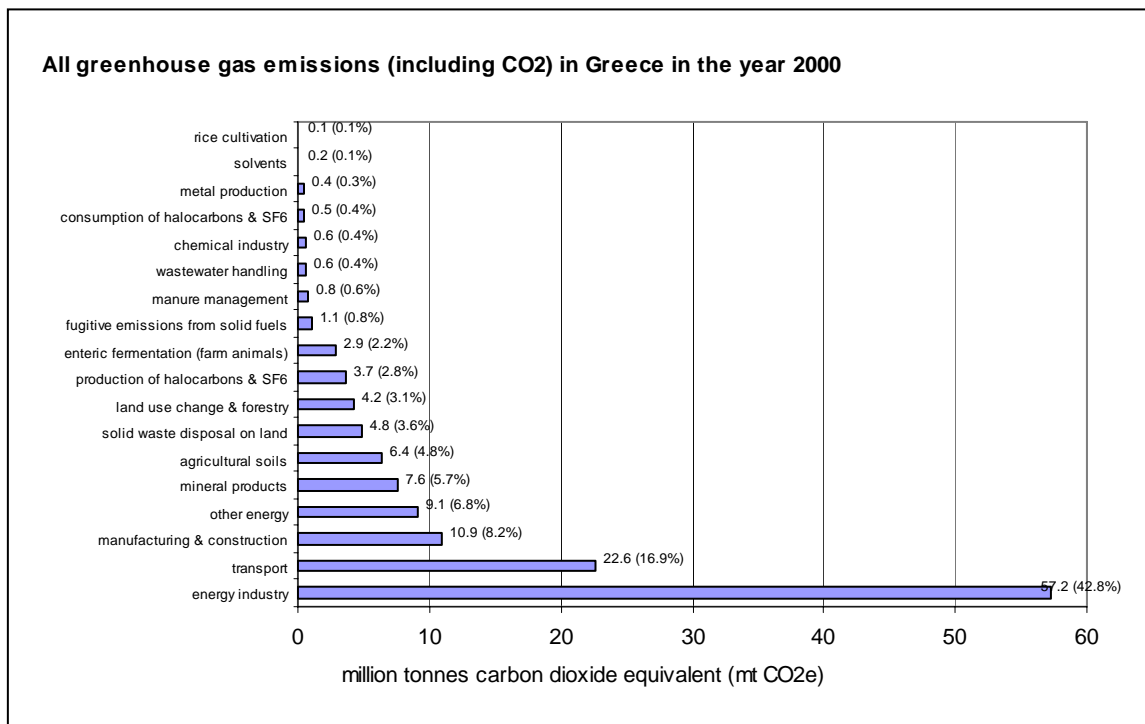
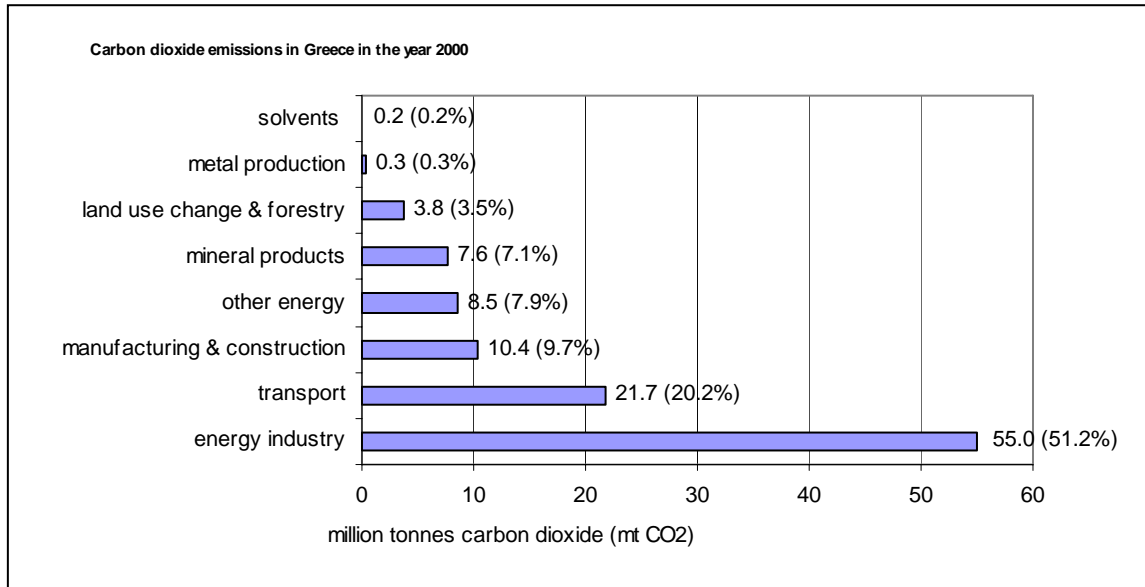


In 2000, CO<sub>2</sub> emissions accounted for over 80% of greenhouse gas emissions in Greece but emissions of other gases are significant and are also growing.

### Greenhouse gas emissions in Greece (million tonnes CO<sub>2</sub> equivalent)

	1990	2000	
	mt CO <sub>2</sub> e	mt CO <sub>2</sub> e	%
CO <sub>2</sub>	85.6	107.8	80.6
CH <sub>4</sub>	8.7	10.6	7.9
N <sub>2</sub> O	10.6	11	8.2
F-gases	1.2	4.4	3.3
	106.1	133.8	100.0

Burning fossil fuels for energy production is clearly the dominant source of greenhouse gas emissions in Greece. In the year 2000, the energy industry emitted 55 mtCO<sub>2</sub> or 51% of all CO<sub>2</sub> emissions. In terms of all greenhouse gases - CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O and F-gases – the energy industry emitted 57 mtCO<sub>2</sub>e or around 43% of all emissions. There are further emissions from other energy activities including on-site generation in industry. A number of other economic activities emit CO<sub>2</sub>. When other greenhouse gases are considered, several more economic activities feature in the statistics.

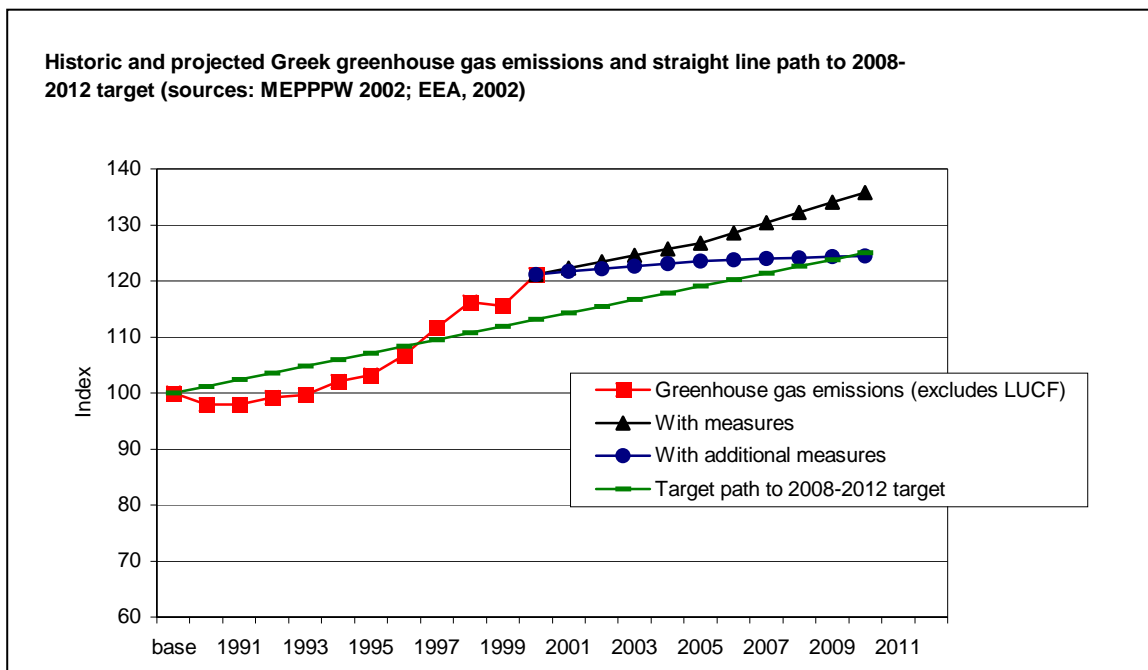


The European Community and all Member States, including Greece, have agreed joint fulfillment of commitments under the Kyoto Protocol. The EU must reduce its greenhouse gas emissions by 8% below 1990 levels by 2008-2012. In quantitative terms, the EU must reduce emissions from

4206 mtCO<sub>2</sub>e in 1990 to 3870 mtCO<sub>2</sub>e in the period 2008 to 2012, or 336 mtCO<sub>2</sub>e each year. The agreement to fulfill this jointly allows different reductions by Member States. The Council of Ministers agreed different emission limitation or reduction targets –essentially in accordance with economic circumstances. The agreement is laid out in Council Decision 2002/358/CE or the so-called “burden sharing agreement”.

**Greece is a partner to the EU “burden sharing agreement” that distributes the EU’s GHG limit under the Kyoto Protocol between Member States. Greece has agreed to limit the increase in greenhouse gas emissions in the period 2008 to 2012 to 25% over 1990 levels.**

The European Environment Agency reports on greenhouse gas emission trends by Member State and for the EC as a whole. The graph below, reproduced from such a report (EEA, 2002) shows the greenhouse gas emissions against an assumed straight-line path to the Greek target +25% in the period 2008 to 2012. There are minor differences between data above and the EEA data (e.g. EEA exclude land use change and forestry).



The general conclusion is evident: Greece is well above its Kyoto target path. The so-called “distance to target indicator”, or difference between actual emissions and target path measured in index units, was +8.7 in the year 2000 for Greece. The EU as a whole is reasonably close to achieving its target, with distance to target indicator +0.5 in the year 2000. There is great variation between Member States. Nine Member States were above their target paths, with Spain, Ireland and Portugal all with distant to target indicators greater than 15 index points, and six Member States below their paths. The latter included Germany and the UK – this is significant because these two countries account for some 40% of greenhouse gas emissions in the EU15.

The graph also shows two projections of greenhouse gas emissions in Greece to the year 2010. These were reported in the 3rd National Communication to the UNFCCC and the two scenarios are “with measures” and “with additional measures”. The former modeled a future economy in which measures set out in the first national greenhouse gas abatement plan are effective; the

latter considered the additional measures set out in the second national plan (see Box 1). "With measures" predicts that greenhouse gas emissions in 2010 will be 147.2 mtCO<sub>2</sub>e, or 35.8% above the base year level 108.4 mtCO<sub>2</sub>e. "With additional measures" predicts that emissions in 2010 may be 134.9 mtCO<sub>2</sub>e, or 24.5% above base year, and within the 25% target for Greece under Kyoto burden sharing.

To achieve the Kyoto burden sharing target will require a change in the current straight-line relationship between the growth in the Greek economy and in greenhouse gas emissions. Step change in the sectors that are significant sources of emissions will be required. The energy sector is the most important. Rapid growth of natural gas power generation and market penetration of renewable energy and cogeneration coupled with vigorous measures to reduce growth in energy demand could, for example, put Greek emissions onto a path of lower growth. Greek economic development is continuing at pace and it does seem that the emissions trajectory presented by the scenario "with additional measures" is highly optimistic. The Greek national target for emissions in 2000 was not met and it is likely that the 2008-2012 target will be missed by a considerable margin.

### Box 1: Measures for greenhouse gas abatement in Greece

#### **Hellenic National Action Plan for Abatement of CO<sub>2</sub> and other Greenhouse Gas Emissions, 1995.**

This plan proposed measures to achieve an overall specified target for abating emissions of greenhouse gases. Projections based on modeling had indicated that a "business-as-usual" course of events would lead to emissions in 2000 in the order 27% higher than 1990. Under the plan, the target was set to restrict total increase in emissions, with regard to a "basket" of three gases (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O), in the 1990 to 2000 period to 15% ±3%. The most important abatement measures affected energy generation supply-side and were:

- introduction of natural gas;
- modernization of existing energy system;
- development of cogeneration units in existing and planned power plants;
- large scale exploitation of renewable energy sources.

The main demand side interventions were:

- introduction of natural gas in industry, tertiary and residential sectors;
- energy conservation in buildings and manufacturing units;
- measures affecting energy use in transport.

#### **Second National Climate Change Programme, 2002**

This plan defined the additional measures to be undertaken to ensure compliance with the target set out under the EU burden sharing agreement. The main actions were

- further penetration of natural gas in all final demand sectors including cogeneration;
- promotion of renewable energy sources for electricity generation and heat production;
- energy conservation in the industrial, tertiary and residential sectors;
- promotion of energy-efficient appliances in tertiary and residential sectors;
- structural changes in agriculture and chemical industries;
- transport and waste management options.

## The European emissions trading Directive

### *Background*

The European emissions trading scheme (ETS) was established by Directive 2003/87/EC dated 13th October 2003.

The ETS is an instrument for environmental protection, arising from the need for the EU to meet its GHG emissions obligations under the Kyoto Protocol. It is argued that Europe-wide emissions trading will harness cost-effective emissions reduction potential and minimise the distortions of competition and internal market barriers that might arise if different schemes were put in place by Member States.

**The European emissions trading scheme is a “cap and trade” scheme that will be mandatory for installations in specified industrial sectors.**

**Each participating installation will require a “permit” to emit greenhouse gases. Permit holders will have “allowances”, denominated in tCO<sub>2</sub>e, which allow a corresponding amount of greenhouse gases to be emitted.**

One EU Allowance (EUA) will equal one tCO<sub>2</sub>e. Permit holders will be obliged to hold allowances equal to actual emissions and to have adequate monitoring, reporting and verification of emissions in place.

Member States (or their relevant authorities) will be responsible for granting permits and allocating allowances. Each Member States will draw up a National Allocation Plan (NAP) which lays out the total cap and the allocation of allowances between sectors and installations.

The emissions trading scheme is central to EU efforts to mitigate GHG emissions. The scheme must be successful for EU to achieve its Kyoto target.

### *Scope*

**The emissions trading scheme covers CO<sub>2</sub>**

The EU scheme covers only CO<sub>2</sub> and not other gases, because CO<sub>2</sub> emissions are easier to monitor and it is the most significant GHG by some margin. The scheme is deliberately restricted to those sectors with relatively small numbers of installations and high levels of emissions.

**The sectors included in the scheme are:**

- **Energy activities**
- **Production and processing of ferrous metals**
- **Mineral industry (cement, minerals, glass)**
- **Pulp, paper and board production**

It is estimated that there will be some 6000 installations covered by the scheme across the EU15. These installations cover some 46% of estimated EU CO<sub>2</sub> emissions in 2010 (or 38% of total GHG emissions in 2010). The Directive will be in force in accession countries from their date of entry

into the EU – so the ten countries that joined on the 1st May 2004 are included in the scheme. There are further ~6000 installations in these countries.

### Box 2: Activities covered by the European emissions trading scheme

Installations (or parts of installations) used for research, development or testing are not covered.

Thresholds generally refer to production capacities or outputs. Where one operator carries out several activities falling under the same subheading in the same installation or on the same site, the capacities are added together.

#### Energy Activities

- Combustion installations with rated thermal input exceeding 20 MW (excepting hazardous or municipal waste installations).
- Mineral oil refineries
- Coke ovens

#### Production and processing of ferrous metals

- Metal ore (including sulphide ore) roasting and sintering installations
- Installations for the production of pig iron or steel (primary or secondary fusion) including continuous casting, with capacity exceeding 2.5 tonnes per hour.

#### Mineral industry

- Installations for the production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or lime in rotary kilns with a production capacity exceeding 50 tonnes per day or in other furnaces with a production capacity exceeding 50 tonnes per day.
- Installations for the manufacture of glass including glass fibre with a melting capacity exceeding 20 tonnes per day.
- Installations for the manufacture of ceramic products by firing, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain, with a production capacity exceeding 75 tonnes per day, and/or with a kiln capacity exceeding 4m<sup>3</sup> and with a setting density per kiln exceeding 300kg/m<sup>3</sup>.

#### Other activities

- Industrial plants for the production of: pulp from timber or other fibrous materials; paper and board with a production capacity exceeding 20 tonnes per day.

The chemicals industry is not included. Firstly because the CO<sub>2</sub> emissions from this sector are relatively small (of the order of 1% of emissions in the EU) and also because the number of installations might be 30,000 or more, so the scheme would become administratively complex. Under the energy sector any plants over 20MW (thermal input) will be included, so this will include some heat / power / cogeneration plant found in the chemical industry.

The emissions trading scheme will apply to installations that are mostly already covered by the Integrated Pollution Prevention and Control (IPPC) Directive (96/61/EC). Some significant CO<sub>2</sub> emitters currently not included under IPCC are also included, notably energy activities in the range 20-50 MW.

Member States are able to combine permitting for the IPPC and emissions trading Directives, although there are differences in the permits. The IPPC Directive – with its broad definition of pollution – actually already covers emissions of greenhouse gases. Normally under IPPC, authorities must fix limits on pollutants, with values based on best available techniques. It is intended that the IPPC Directive will be amended so that installations included in emissions trading do not have CO<sub>2</sub> (or other GHG if applicable) emissions limits imposed by their IPPC permit.



*Start date and phases*

**The initial period will be from 1st January 2005 to 31st December 2007 and there will be subsequent consecutive five year periods.**

The scheme will start on 1st January 2005 and there will be a first, or preliminary, phase to 31st December 2007 followed immediately by a second five year phase (and subsequent five year phases after that). The second phase will coincide with the first commitment period under the Kyoto Protocol, 2008 to 2012, during which legally binding targets will limit GHG emissions in Member States (and other signatory countries to the Protocol). The preliminary phase is intended to prepare Member States and their industries for the international carbon economy under the Protocol. In view of the fact that there are no legally binding targets limiting GHG emissions until 2008, the preliminary phase differs in a number of limited ways, including opt-outs and lower penalties.

Member States can propose that individual installations and / or individual industry sectors opt-out of the scheme for the preliminary period. However, the Commission will retain the right to veto such opt-outs. Most important is the fact that exempted installations must commit to equivalent emission cuts and be subject to the same reporting and verification requirements carrying equivalent penalties for non-compliance. In fact, this provision is actually to allow existing national emissions trading schemes, such as in the UK, to continue operating. There will be no opt-outs in the second phase.

*Allocation of allowances*

**Allowances will be allocated by Member States. The deadline for National Allocation Plans was the 31st March 2004 for the EU15 and 1st May 2004 for the 10 accession countries.**

**During the preliminary phase, Member States must give at least 95% of allowances free of charge, the remainder may be auctioned. In the following period, up to 10% of allowances may be auctioned.**

Member States allocation of allowances will be based on the requirements of the scheme and national commitments under the Burden Sharing Agreement. The Directive explicitly states that Member States must show that they are on a path to meeting their Kyoto Protocol obligations. There are safe-guards to protect against over-allocation of allowances.

The aim of the National Allocation Plan (NAP) is to fix the cap on CO<sub>2</sub> emissions from installations participating in the scheme and to ensure fair allocation of the task of emissions reduction:

- Between sectors participating in the trading scheme and the rest of the economy;
- Among sectors participating in the trading scheme, and;
- Among installations in the participating sectors.

There is some risk that if different principles are used to allocate allowances to companies that compete across Europe, competition might be distorted. For example, a Member State might allocate allowances that exceed the likely needs of a sector or installation, but this would be considered illegal State aid. To protect the internal market, Member States have had to apply common criteria for their allocation plans and have had to notify the Commission and other

Member States. The criteria for NAPs are laid out in Annex III of the Directive, and this is reproduced in Box 4.

### Box 3: Trading and the Burden Sharing Agreement

Member States have agreed to redistribute their targets under the Kyoto Protocol in accordance with the Burden Sharing Agreement. Greece has agreed to maintain national emissions during the period 2008 to 2012 at 25% above 1990 levels, and other Member States have agreed different commitments. Overall the EU must reduce GHG emissions by 8%. The text below outlines how emissions trading across Europe will be integrated with national commitments.

If allowances are traded within a Member State, there will be no changes to the emissions allowed by that Member State under the Burden Sharing Agreement. For trades by installations in different Member States, adjustments will be made recorded on national registries. Selling an allowance to an installation in another Member State means the originating Member State loses its entitlement to emit one tCO<sub>2</sub>e under the Burden Sharing Agreement. Buying an allowance from another Member State will entitle an extra tCO<sub>2</sub>e to be emitted in the Member State in which the installation is located.

Thus, the precise entitlements of each Member State will be adjusted to correspond with trades that its installations makes but, in the EU overall, emissions entitlements will remain the same.

The system of linked national registries will obviously be essential to hold and track allowances. It will also be important for progress to be monitored and to check if individual Member States, and the EU as a whole, will achieve their commitments.

### Box 4: Criteria for National Allocation Plan

The following is adapted from Annex III of the Directive:

- 1) Total quantity of allowances must be consistent with Member State's obligation to limit its emissions under the Kyoto Protocol and European Burden Sharing Agreement, and take into account emissions that will arise from sectors not included in the European emissions trading scheme.
- 2) Total quantity of allowances allocated will be consistent with assessments of actual and projected progress towards fulfilling Community's commitments under Decision 93/389/EEC concerning the monitoring of GHG emissions
- 3) Quantities of allowances to be allocated will be consistent with the technological potential of installations to reduce emissions.
- 4) The allocation plan will be consistent with other EC legislative and policy instruments. The plan must take account of unavoidable increases in emissions resulting from new legislative requirements.
- 5) The plan must not discriminate between companies or sectors so that certain activities are favoured.
- 6) The plan will contain information on how new entrants will be able to begin participating in the trading scheme in the Member State.
- 7) The plan may accommodate early action.
- 8) The plan shall contain information on how clean technology, including energy efficient technology, will be taken into account.
- 9) The plan will include provisions for public to comment, and information on arrangements by which due account of these comments will be made.
- 10) The plan shall contain a list of installations covered and quantity of allowances to be allocated to each.
- 11) The plan may contain information on how competition from outside the EU will be taken into account.

Further guidance was provided for each of the above criteria by the EC in the document COM(2003) 830 final dated 7th January 2004.

The EC also published a "Non-Paper" titled "How to develop a national allocation plan" (European Commission, April 2003). The EC "Non-Paper" stressed the following points:

- Allocations will be made before the beginning of each period (the initial period being 2005 to 2007 and consecutive 5 year periods thereafter).

- The total quantities of allowances to be allocated to each operator for the whole period will be known from the outset. Allowances will be issued annually.
- The issue of allocation for the period will be closed before the period begins. Any allocation discussions can only concern the initial allocation for the next period.
- A “benchmarking” approach could be used for allocation (i.e. use a target level of emissions per unit input or output).
- As stated in the draft Directive, allocations to individual operators or sectors must not constitute incompatible state aid (i.e. aid which would distort or threaten to distort competition to an extent contrary to the common interest)
- The NAP must be based on objective and transparent criteria.

The “Non-Paper” identified six steps in the process of establishing a NAP. These are outlined below. It is stated that the process of drawing up the NAP is likely to require looking at both the historic and expected future emission patterns in the economy as a whole, at the level of sectors, and within sectors.

<b>Box 5: The six steps to establish a National Allocation Plan (source: European Commission, April 2003)</b>	
1) Top-down analysis to define the share of emissions covered by the Directive	<p>The Member State needs to do a top-down economy-wide analysis of the proportion of its total allowable emissions under the Kyoto Protocol that it will allocate to all the installations covered by the emissions trading scheme. Three basic approaches can be taken:</p> <ul style="list-style-type: none"> <li>• Historical. Consider emissions in a particular year or years.</li> <li>• Forecasting. Estimate the emissions that would result under “business as usual” without CO<sub>2</sub> abatement measures.</li> <li>• Least cost. Consider which sectors have high / low cost measures and allocate low / high reduction targets respectively.</li> </ul> <p>Comparing results from all approaches will establish a preliminary range of total allowances to be included in the NAP. The Member State also needs to consider its path to its Kyoto target and measures in other sectors, e.g. transport, not included in the emissions trading scheme.</p>
2) Bottom-up exercise to collect data from installations	<p>A list of the installations to be covered by the scheme needs to be established. Data covering current emissions, historical emissions and expected future emissions should be collected. Data on output could also be collected if there is an intention to use a “benchmarking” approach to determine allocations.</p>
3) Consolidation of top-down and bottom-up information	<p>The data that the steps 1) and 2) gives is unlikely to coincide closely. Resolving this discrepancy may involve deciding how much abatement action to impose on sectors covered by the scheme and what measures to take for sectors outside the scheme. The result will be a final decision on total allocated allowances, or cap, to be included under the NAP.</p>
4) Setting allocations for sectors and installations	<p>Allocations may be based on historical, forecasting or least cost approaches. Allocation within a sector might also use a “benchmarking” approach, or a target level of CO<sub>2</sub> emissions per unit input or output.</p>
5) New entrants	<p>The NAP must contain information on how new entrants can begin participating in the emissions trading scheme. New entrants must have access to allowances. Member States may choose to let new entrants buy allowances on the market. In this case, total allocated allowances, calculated under step 3), does not need to be adjusted. Alternatively, a reserve of allowances might be created and new entrants could be given a free allocation. This would reduce slightly the allowances given to initial participants.</p>
6) Completion of the NAP	<p>A summary and draft of the NAP. It must include details on public consultation.</p>

*Trading of allowances*

**Allowances can be traded between companies within or between Member States.**

**The scheme is also linked to project mechanisms under the Kyoto scheme.**

Companies that require extra allowances will need to buy them - the scheme is consistent with the "polluter-pays" principle. Each year, companies must submit for cancellation a number of allowances that corresponds to their actual direct emissions. Companies will be penalised if they do not have enough allowances at the point of annual reconciliation.

Allowances will be held and trades tracked by national registers that will be linked. Allowances will only exist in electronic format. Participants will hold accounts in national registries. Clearly a high degree of consistency will be required and detailed rules will be established by the European Commission.

**Box 6: Collective pools to trade emission allowances**

Participating industries can pool their allowances, by sector for example. The sectoral association may buy extra allowances or sell surplus allowances on behalf of all. The operators of each installation will still have to monitor its emissions and, at the point of reconciliation, each will have to hold sufficient allowances to cover its actual emissions. This provision will give some added flexibility to industry in the approach to emissions trading.

It will be possible to hold, or bank, allowances from one year to the next within the preliminary 3 year period and within the second 5 year period of the scheme. The Directive states that Member States must decide whether allowances can be banked from the preliminary period into the second period. The intention is that allowances will be bankable from period to period from 2008 onwards. Banking allowances has no effect on the environmental integrity of the system but does give much greater flexibility for participants. It will help the development of different types of transactions – "options" etc – that allow risks to be hedged.

Third parties, such as environmental NGOs, will be able to buy allowances and cancel them. This allows the public to participate but this will not have a significant impact on price in the large liquid market that is foreseen.

The EU-wide scheme will create a uniform price for an allowance across the whole of the scheme. From the start of trading, all installations covered by the scheme, from one side of the Community to the other, will be faced with the same price of emitting one extra tCO<sub>2</sub>e. This should, in theory, help ensure that cost-effective emissions reduction measures are taken.

***Monitoring, reporting and compliance***

**Operators will need to identify the activities included and, for each activity on each site, put in place systems to collect data allowing emissions to be calculated or measured.**

The EC will draw up guidelines for operators to monitor and report their emissions. The principles on which monitoring and reporting will be based are reproduced in Box 7.

**Reports by operators will need to be verified, either by Member States' competent authorities or by independent verifiers.**

Member States must decide who will do the verification and who will bear the cost of the verification

<b>Box 7: Principles for monitoring and reporting</b>
<p>CO<sub>2</sub> emissions shall be monitored either by calculation or on the basis of measurement.</p> <p>The following equation will be used: activity data x emission factor x oxidation factor</p> <p>Activity data, such as fuel use or production rate, shall be monitored using supply data or by measurement.</p> <p>Accepted emission factors will be used. Activity-specific emission factors are acceptable for all fuels. Default factors are acceptable for all fuels except non-commercial ones (waste fuels such as tyres, industrial process gases). Seam-specific defaults for coal and EU-specific or producer country-specific defaults for natural gas shall be elaborated. IPCC default values are acceptable for refinery products. The emission factor for biomass shall be zero.</p> <p>Some carbon will not be oxidised and therefore will not be emitted to the atmosphere (eg some carbon remains in ash produced by combustion). If the emission factor does not already account for the fact that some carbon is not oxidised, then an additional oxidation factor shall be used.</p> <p>IPCC default oxidation factors shall be used, unless the operator can demonstrate that activity-specific factors are more accurate.</p> <p>A separate calculation shall be made for each activity and for each fuel.</p> <p>Measurement of emissions shall use standardised or accepted methods and shall be corroborated by a supporting calculation of emissions.</p> <p>For each activity carried out on the site for which emissions are calculated, the report will contain: activity data; emission factors; oxidation factors; total emissions.</p> <p>For each activity carried out on the site for which emissions are measured, the report will contain: total emissions; information on the reliability of measurement methods.</p> <p>Member States shall take measures to co-ordinate reports required for emissions trading with other reporting so the burden on business is minimized.</p>

**The penalty price for non-compliance is €40 per tonne from 2005 to 2007 and €100 per tonne from 2008 to 2012.**

**Paying the penalty does not remove the obligation to submit allowances corresponding to the excess emissions.**

If these penalty prices are compared to the range of actual market prices since trading began in February 2003 (€5 to €13, see below), it is evident that these have been set at a very high level. It is also important to note that imposition of the financial penalty does not remove the obligation on the operator to submit allowances corresponding to the excess emissions, but rather the operator will have to surrender the allowances in the following year. These features are deliberately made so that operators will not take the penalty, but rather will take measures to reduce their CO<sub>2</sub> emissions or engage in trading to avoid non-compliance. It is important that operators do not simply continue business as usual and take the fines because this would mean that emissions reductions are not achieved.

*Links with the rest of the world***The emissions trading scheme will be linked with Joint Implementation and the Clean Development Mechanism**

From the global environmental point of view, the place where emission reductions take place is not important provided that real emission reductions are achieved. Less expensive reductions may be achieved outside Europe, in countries with industries with poor standards of environmental and energy efficiency. The price of EU allowances is expected to be lower because of linking and there will be a wider market with more liquidity which is less subject to price shocks etc. At the same time, there will be transfer of environmentally-advanced technology and know-how from Europe to economies in transition and developing countries. This is some of the rationale for linking the EU ETS to developments in the rest of the world.

The commitments that developed countries that have taken on under the Kyoto Protocol are expressed as Assigned Amount Units (AAUs). The assigned amount is the total amount of GHG that each country is allowed to emit during the first commitment period of the Kyoto Protocol (i.e. 2008 to 2012). AAUs can be traded, e.g. either to help achieve the assigned amount or if the assigned amount is over-achieved. Indeed, the Japanese and Dutch governments have already purchased AAUs from Eastern European countries. AAUs are sovereign instruments and must be delivered via government accounts in national registries.

There are three mechanisms under the Kyoto Protocol: emissions trading and two project-based mechanisms. The mechanisms use tonnes CO<sub>2</sub>e but with different names. The Clean Development Mechanism (CDM) allows developed countries (with caps under Kyoto) to make investments in GHG mitigation projects in developing countries (without caps). Certified Emission Reductions (CERs) are the GHG emission reductions achieved by project activities under the CDM. CERs can be issued for emission reductions achieved from 2000 onwards. Joint Implementation (JI) projects can be undertaken in any developed country. Emission Reduction Units (ERUs) are the reductions achieved by such projects. ERUs can be awarded for reductions from 2008. There are also Removal Units (RMUs), credits related to carbon "sinks" i.e. eligible land use changes and forestry activities.

In a press release dated 20th April 2004, the EC announced that the European Parliament had voted its approval of the so-called "Linking Directive". The main elements are as follows (European Commission, July 2003).

The EU emissions trading scheme will be linked to CDM and JI but neither Assigned Amount Units or allowances from "sinks" will be eligible for use under the EU scheme. The use of credits from "carbon sinks" will be reviewed by the Commission in 2006. Nuclear power projects are excluded (indeed they are excluded by the Kyoto Protocol). The proposed Directive also requires Member States to ensure that the environmental and social impacts of large hydroelectric power projects are addressed through the application of relevant international criteria and guidelines when they approve such projects.

With these exceptions, CDM and JI credits are recognized as equivalent to EU allowances from an environmental and economic point of view. Companies in the EU trading scheme will be able to use the credits from such projects, once they are issued, up to a percentage of their allowed emissions. The limit will be decided by each Member State and will guarantee that a significant

reduction of greenhouse gas emissions still takes place within the European Union, and not abroad. There is no quantitative limit to the amount of CERs or ERUs that can be imported to the EU but Governments are bound to consider the issue of "supplementarity" i.e. doing more than half of the emissions reductions domestically.

**The EU will review linking with Kyoto once the number of CERs plus ERUs reaches 6% of the total quantity of allowances allocated under the EU ETS.**

The actual process will be as follows. Operators of installations in the EU will hold CERs or ERUs either via generating these themselves through ownership / investment in JI or CDM projects or via purchase on the market. These operators can apply to their Member State for conversion of the CERs or ERUs to allowances. The allowances would come in addition to those allowances that are allocated in NAPs to operators.

### *The double counting principle*

**Both the Directive and Linking Directive seek to forbid double counting by adopting the principle that one tonne of emissions will be accounted for only once and a reduction of it should not be rewarded more than once.**

Avoiding double counting has both environmental and economic logic. Hence in the power sector, allowances are given to the generators (the direct emitters) and not to the industrial or other consumers of electricity (the indirect emitters). The latter will pay the cost of the allowances when and if it is passed down the supply chain according to market forces. Also, generators using carbon-free sources (i.e. renewable energy such as wind, biomass) will not be allocated allowances.

**Renewable energy generators do not emit CO<sub>2</sub> and are therefore not included in the ETS. Renewable energy will benefit from the fact that no allowances need to be obtained and surrendered while inclusion of producers using coal, oil or natural gas implies they should have higher costs.**

With regard to the Linking Directive, the main consequence is that projects that have an impact on installations covered by the ETS are forbidden from being approved as JI. Thus, renewable energy projects reduce the demand that there would otherwise have been from conventional generators so rewarding the former with allowances would be double counting. There are some exceptions for the ten new Member States and new accession countries where there has been considerable effort to develop JI projects.

The reader will see that double-counting provisions under both the ETS and the links to Kyoto can dictate who gains or loses from allocation and that the issues are complex. For example, impacts on cogenerators of heat and power may be perverse from both economic and environmental points of view and the reader is referred to material from the trade association Cogen Europe for further information and opinion (see References).

### **Status of National Allocation Plans**



NAPs were due to be submitted on 31st March 2004 and 1st May 2004 for the EU15 and the 10 accession states respectively. Few countries met these deadlines exactly. A first round of eight NAPs were assessed by the Commission by early July. At the time of writing (mid-October), the Commission's second round of assessments is expected imminently. The current status of NAPs is shown in the table below but the reader should be aware this could be out-of-date. Greece is the only country for which a draft or final NAP is not yet available (Cyprus and Malta do have to submit NAPs).

Final NAPs assessed by the Commission			
		Allowances for period 2005-2007 (million tonnes)	Number of installations
Austria	Accepted, technical changes required	98.2	205
Denmark	Accepted, no changes required	100.5	362
Germany	Accepted, technical changes required	1497.0	2419
Ireland	Accepted, no changes required	67.0	143
The Netherlands	Accepted, no changes required	285.9	333
Slovenia	Accepted, no changes required	26.3	98
Sweden	Accepted, no changes required	68.7	499
United Kingdom	Accepted technical changes required	736.0	1078
Final NAPs not yet assessed by the Commission			
Belgium	Lithuania		
Estonia	Luxembourg		
Finland	Poland		
France	Portugal		
Italy	Slovak Republic		
Latvia	Spain		
Draft NAPs			
Czech Republic			
Hungary			
Not yet submitted			
Greece			

An important question is whether NAPs concur with the main goal of the ETS i.e. will they help Member States be on a path to achieve their burden sharing agreement? Several studies of NAPs (e.g. IVL, August 2004; Ecofys, August 2004) have concluded that, in general, first period allocations have been over-generous and the contribution to Kyoto achievement will be limited.

The four sectors within the ETS typically account for around half of national CO<sub>2</sub> emissions, though this varies between countries. Given the purported economic and environmental efficiency of the ETS, sectors within the ETS should be given a relatively high proportion of the CO<sub>2</sub> reduction that countries need to make to achieve their Kyoto targets. However, analyses show that the opposite is the case. Many governments have allocated on the basis of industries' projected needs, typically historic emissions multiplied by a growth factor, and these allocations mean that ETS sectors have been given less than their pro rata share of the GHG mitigation burden rather than more.

The onus to mitigate GHG emissions therefore falls on non-ETS sectors – other industrial activities, commerce, residential and transport – despite the fact that it is clear that GHG reductions will be extremely hard to achieve in these sectors. National governments plan to set up programmes to buy CERs and ERUs from CDM and JI respectively, thereby increasing their

national caps, in effect buying the right for their industries to emit. At least nine countries have stated plans for CDM and JI. This includes the already well-established Dutch government programmes. Some other measures, such as expansion of renewable energy, might contribute to mitigate emissions growth. But despite positive rhetoric from the European Commission and national governments, it is evident that the ETS will, in the first period, be of limited value to help Member States be on a path to achieving their Kyoto targets.

This outcome from the NAPs is unsurprising. Most observers view the first phase as a period of learning for administrators, companies, consultants providing support etc. Some countries are already advanced in these respects, for example the UK has experience with its national scheme and the related climate change levy (tax). However, for many of the 12,000 installations in the EU25, monitoring and reporting GHG emissions, forecasting emissions, trading etc. are new activities. The Commission has taken a pragmatic approach to get the ETS underway in the first phase and tougher restrictions are expected in the second phase.

Allocation has typically been most stringent for the energy sector. One reason has been that the energy sector is believed to have good potential for reducing emissions, not least ongoing switch from coal generation to gas. Importantly, this sector has a relatively fixed geographical nature (albeit there is significant import and export of electricity for some Member States) and thus can pass on costs arising from the ETS to its customers. Companies in other sectors compete internationally and governments have not wished to impose costs on such industries.

In the first round of assessed NAPs, the main objection made by the EC regarded proposed ex post adjustments. The EC states that allocations must be fixed from the beginning of the period. Austria and Germany both propose forms of amending the allocations. Germany plans to adjust allocation if an installation has annual emissions that fall below 40% of the base period emissions. There are provisions in the German NAP for adjusting allowances if the power generated from CHP is less than during the base period. Also, Germany plans to adjust the allocation to the new entrants reserve. The German government has filed a lawsuit to challenge the EC's decision. The EC also requested the UK for clarifications (installations in Gibraltar and participation by new entrants).

The Commission has not, to date, significantly reduced the national caps made by governments. One exception has been the Netherlands for which the cap was reduced by 3%. Following the Commission's opinion, France has included combustion facilities in the chemical industry – these were excluded in an early draft of the NAP.

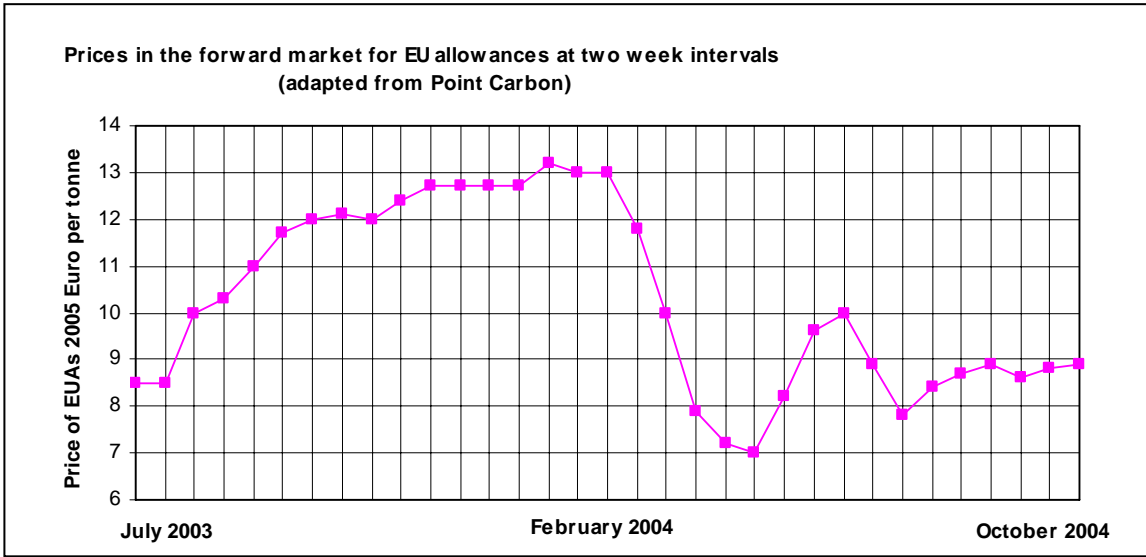
## Actual trading of allowances to date

There will be trading activity under the ETS in the first period regardless of whether or not significant net reductions of CO<sub>2</sub> emissions arise from the scheme in the first period. Estimates of aggregate net demand in the EU range from zero to 60 million tonnes annually. With the release of NAPs, political uncertainties are reduced, but economic factors and future weather are unknowns. Weather impacts the energy industry – hard winters in Europe could drive energy demand and cause more generators to have allowance shortfalls. One estimate indicates that if EU-wide emissions growth is 0.5% per year higher than expected, due to better economic growth than expected, then zero net demand will be translated into demand for 40 million tonnes per year.

Irrespective of aggregate supply and demand, there will be companies who are long (i.e. sellers) and others who are short (i.e. buyers) of allowances. Although allocations are generally generous, some companies notably power utilities will be given caps that will give them a shortfall of allowances. Many industries will not operate at predicted levels: some sites will have lower output than expected and some will close, so freeing up allowances. Demand for allowances will be created by sites that operate at higher levels than expected and newly commissioned sites. Another factor is that companies expect that more severe constraints will be placed on GHG emissions in the future so they must be active and knowledgeable in this new market, albeit their trades will be limited in extent.

In the run up to the start of the scheme, a forward market for EU allowances has developed. Price and volume are published each week by analysts Point Carbon, who consult with ~9 brokers who trade allowances. The first trades in EUAs occurred in February 2003. The price in June 2003 was around €5 per tonne and this rose quite steadily to a price of around €12 in September 2003 rising gradually to a peak of €13 in January 2004. The peak was prior to the deadline for submission of draft NAPs and was driven by the perception that NAPs would result in many companies being short and also that the publication of NAPs would raise awareness of the scheme among companies. During February and March, with growing awareness that NAPs would be generous, the price fell sharply, to a bottom level of around €7 in May 2004. The price recovered to €10 in June and since that period the price has fluctuated in the range €7.5 to €9. There are differences in price (of the order of €0.05 to €0.20) between different vintages (i.e. EUAs for 2005, 2006 and 2007).

The volume of allowances traded is growing rapidly as the ETS start date approaches. Until July 2004, there were typically a handful of trades each week in Europe, totaling some thousands of tonnes. There were weeks with no trades. During September and October, brokers have reported considerable growth in volume. More than 1.2 million tonnes were traded in September – up to that time total trade from February 2003 had been around 1 million tonnes. In the first week in October 700,000 tonnes were traded. The market remains embryonic but the current sharp upward trend in liquidity is expected to gain further impetus when installation-level allocations are finalized.



**Advice for Greek companies: what steps to take?**

Most observers comment that the Commission is taking a pragmatic and long-term approach and try to achieve start-up of the scheme on time on 1st January 2005 with a view to tightening the allowances in the second and subsequent periods. Indications are that while allocations in the first period are generous, allocations in the second period will be more restrictive. It is notable that no NAPs have allowed banking of allowances between first and second periods, although the Directive in theory permits governments to allow such banking. This possibly reflects the fact that governments will be faced with legally-binding targets under Kyoto in the second period, and wish to keep the option of making real reductions via the ETS rather than the scheme being flooded by banked allowances acquired in the first period.

In view of the likelihood that the scheme will become an important market for installation operators across Europe in the medium-term, steps that Greek companies should do include:

- appoint responsibility to senior managers and gain an understanding of this new field
- put in place systems of accounting for CO<sub>2</sub> (and other GHGs) in their installations, establish emissions targets and monitor performance against these targets
- learn by conducting small trades in EUAs, CERs and ERUs, and set up GHG trading systems within their companies
- assess financial and compliance risks and weigh up options for hedging risks
- appraise assets and liabilities in this new market including modeling impacts at business and installations levels
- assess CO<sub>2</sub> and other GHG abatement options and their costs
- understand synergies with other legislation, for example links between Integrated Pollution Prevention and Control (IPPC) Directive (96/61/EC)
- understand how to account for allowances and their obligations under the ETS within company statements (profit and loss, balance sheet).
- assess whether operation of environmental management systems (e.g. ISO 14001 or EMAS) will help undertake the monitoring and reporting required under the scheme as well as other environmental demands.

Above all, companies determine a strategy for operating under the emissions trading scheme, especially those with significant risk exposure. Legislation that deals with wide environmental issues is becoming increasingly important. Greek companies are becoming obliged by law to incorporate protection of the environment into their business strategies. In northern Europe and north America, market-based drivers are becoming equally important as direct legislative or regulatory drivers, and companies are proactively working to improve their environmental performance, to achieve positive corporate image and to have clean credit ratings enhancing their access to investment capital. These changes will need to be made by Greek managers.

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**Europaena Commission**

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**Green prices**

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**ETRES project**

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