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## CHAIRMAN'S BACKGROUND DOCUMENT 8

### Subject: “Defining the coverage: trading population and gases”

#### 8. Introduction

The Green Paper on greenhouse gas emissions trading within the European Union stated that: “Since the economic gains from trading arise from differences in abatements costs between companies covered by the trading system, this would argue in favour of as wide and as varied a sectoral coverage as possible”. This also holds true with respect to gases.

In any discussion on “participation” distinction must be made between: (i) participants who have to retire permits to the authorities at the end of each compliance period to cover their emissions in the period; (ii) participants who may be allocated allowances free; and, (iii) participants, such as market intermediaries that participate in the secondary market (buying, selling or holding emissions allowances or credits) but who do not have emissions covered by the obligations of the trading programme. In most discussions, it is assumed that (i) and (ii) will perfectly overlap, although this must not necessarily be the case. In this paper, the focus is mainly on the first aspect, namely participants with the obligation to cover their emissions with allowances.

This Background Document has had to make several assumptions, the most important of which is that, for those sectors or facilities not covered by emissions trading, other policies and measures will apply. Without this proviso, it will be difficult to start an emissions trading scheme whereby entities assume obligations that will cost them money to fulfil.

Another important assumption is that a scheme with limited coverage should be ready to start sooner than a more comprehensive scheme. Recalling the “80-20” principle, that 80% of emissions are covered by 20% of sources, it was the Commission’s thesis to start emissions trading among the largest fixed point sources.

Many of the comments received in response to the Green Paper (COM(2000)87) argued in favour of greater flexibility regarding the sectoral coverage of emissions

trading. In different Member States, the share of CO<sub>2</sub> emissions from the sectors identified in the Green Paper varies considerably, largely depending on the fuel mix of their power generation sector, but also on more specific factors (e.g. pulp and paper is confined to a few Member States).

However, there was widespread support for a mix of sectors to be covered. In order to include a greater number of sectors, support was given to the idea that Member States could allow other sectors to join an emissions trading system if they fulfilled the eligibility criteria in respect of monitoring and reporting.

Having said this, however, other submissions argued for a considerable degree of harmonisation of the sectors covered, and in favour of mandatory coverage so as to avoid distortion of competition.

A possible way forward would be to have a mandatory core – with “discretionary edges”. The mandatory core would be composed of the sectors specified in Table 1 of the Green Paper:

**Table 1: Possible industry sectors to include in an emissions trading system<sup>1</sup>**

<b>Sector</b>	<b>Percentage of EU15 CO<sub>2</sub> Emissions<sup>2</sup></b>
Electricity and heat production	29.9%
Iron and Steel	5.4%
Refining	3.6%
Chemicals	2.5%
Glass, pottery and building materials (including cement )	2.7%
Paper and printing (including paper pulping)	1.0%
<b>Total</b>	<b>45.1%</b>

Source: EUROSTAT 1997 figures.

Of major importance in this context is whether “upstream” or “downstream” trading is introduced. For the purposes of this paper, the terms “upstream” and “downstream” refer to the point in the economy where the emissions are restricted and allowances need to be handed over to the public authorities to cover emissions (actual emissions in the case of “downstream”; embedded emissions in the case of “upstream”). This distinction is mainly valid for CO<sub>2</sub> emissions, the major part of the emissions covered by the Kyoto Protocol. The choice of “upstream” or “downstream” constitutes a first narrowing of the potential trading population.

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<sup>1</sup> These respective shares assume the calculation of “direct” emissions including all sources in the sector regardless of size.

<sup>2</sup> Energy related for 1997.

## **8.1 Problems of definition of sectors and sources**

The definition of sectors is problematic in practice. There are always going to be borderline cases that are difficult to categorise in one sector or another. Many companies are conglomerates, and undertake activities attributable to several sectors. Common terminology would be important if the trading population was defined by sector.

The most practical way forward would be for emissions trading to focus on individual facilities (or “plants”, “sites” or “installations”), and the emissions/capacity thresholds for these should be the determinant criteria for inclusion. Facilities below this threshold should be able to “opt-in” to a scheme. It would be desirable to establish objective and clear criteria and a process for such “opt-in” when starting the scheme. Once a source has “opted-in”, continued participation would be mandatory.

## **8.2 Multinationals – not a special case**

As discussed above, trading would probably cover individual sites. The owner of the source would be liable to fulfil the obligations and suffer compliance consequences if appropriate. Multinationals are, of course, just large entities with sites in several countries. Their scale apart, multinationals are much the same as national companies. One particular element, however, is the possibility of transferring allowances between jurisdictions without payment, and “transfer pricing”, which may present particular difficulties to tax authorities, but neither of these problems would be new or unique to emissions allowances or credits. The ability of multinationals to move permits (or credits) around very rapidly is not so different from national entities that can buy or sell internationally – as long as there is a sufficiently liquid market. Finally, multinationals have the greatest interest in there being a more co-ordinated approach to emissions trading between the national markets in which their operations are located.

## **8.3 All sectors of industry should not necessarily be treated similarly**

Fair competition and internal market arguments do not require an equivalence of effort between different sectors. Governments may deliberately choose to ask for larger contributions from some sectors than from others. Competition concerns are always between similar sectors in different Member States, just as they are with similar sectors outside the Community. What matters for the internal market is that approximate equivalence of effort is ensured within the same sectors throughout the Community. There are obviously sub-sectors of industry that compete against others: concrete is often in competition with steel in the building materials market. But concrete producers are not in competition with vehicle manufacturers. While arguments that hold good for one energy-intensive sector may also hold good for others, distortions of competition should not arise within the Community as a result of the inclusion of one sector in an emissions trading scheme and the exclusion of another very different sector.

However, economic inefficiencies could arise if the target for those sources covered by the trading scheme implied a substantially different marginal

abatement cost than for those outside the scheme. If such a situation arises, countries would spend more than necessary to implement their target, or alternatively, for the same cost, could have cut emissions further, if efforts were re-allocated.

The Dutch submission to the Green Paper argues in favour of sectors exposed to intense international or Community competition being included in an emissions trading system, ideally among all industrialised countries, but at least throughout the Community. For the sake of maintaining their competitiveness, these “exposed sectors” should not, according to the Dutch submission, be subject to other (more costly) policies and measures. Building on the Dutch argumentation, one may consider it desirable to harmonise also the starting points for trading (i.e. the initial allowance allocations) for the “exposed sectors” across the Community. The difficulty lies, obviously, in the definition of the “exposed sectors”.

#### **8.4 Power & heat generation: the significance of size thresholds and “on-site” v. “off-site”**

The power and heat generation sector is a key sector with regards to emissions trading, especially if the scheme wishes to cover a significant percentage of emissions. Indeed, without the electricity supply sector, a Community emissions trading scheme would be scarcely worthwhile.

Having said this, though, the power-generation sector is changing. The internal market in electricity and gas is becoming increasingly competitive as a result of liberalisation. The Commission recently put forward<sup>3</sup> a Proposal to the Council and European Parliament providing for the full opening of the electricity and gas markets by 2005. One of the major changes triggered by liberalisation is a trend towards smaller generation installations. This may raise difficulties if a threshold approach is used, where only the largest generators are covered by trading, and the smaller installations fall outside a mandatory system. The size threshold in the Large Combustion Plant Directive of 50 MW installed capacity may not be an appropriate base for selecting trading participants, if the trend to smaller power plants continues. In particular, if the assumption of equally demanding policies and measures for sources not covered by trading does not hold in practice, one may even see the movement to smaller power plants accelerate, since building smaller power plants would allow operators to “escape” emissions obligations. Perhaps for this sector, a lower threshold would be warranted than in other sectors.

It should be noted that the economic analysis behind the Green Paper counted “auto-generation” capacity, or “on-site” capacity (including combined heat and power plants), as within the power and heat generation’s sectoral figure of 29.9% of EU CO<sub>2</sub> emissions in 1997. If this auto-generation capacity were attributed to the “industrial” sectors (chemicals, pulp and paper, iron and steel, etc.) that consume the electricity and heat (an approach taken by the IPCC guidelines for national inventories), then the relative share of these “industrial” sectors would have been quite significantly increased. It is estimated that about 10% of the total

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<sup>3</sup> COM(2001)125 adopted by the Commission on 13 March 2001.

power & heat sector's capacity takes the form of "auto-generation" (corresponding to approximately 3% of EU CO<sub>2</sub> emissions in 1997). Furthermore, auto-generation is expected to grow further up to 2010. While in 1990 about 124 MtCO<sub>2</sub> originated from industrial auto-producers, the emissions output is expected to double over the next decade. Hence, in 2010 emissions from auto-generation could amount to almost 7 % of total emissions and close to a quarter of power and heat sector emissions.

#### **8.5 Power and heat generation: how to treat in a "downstream" trading scheme – "direct" or "indirect" coverage?**

Another important issue concerning the coverage, already touched on in Background Document 6, is the treatment of power and heat generators. While the more obvious route – the one taken in the Green Paper – is to include them directly in a "downstream" trading scheme, one could also make the consumers of power and heat accountable for the sector's emissions on an "indirect" basis. Technically this implies that the emissions from the power and heat sector are covered *after* the actual point of emissions, i.e. further than "downstream".

Both approaches have merits. Emissions from the power and heat sector can be reduced in at least two principal ways – (i) use of cleaner fuels for power and heat generation and (ii) reduction in the consumption of power and heat by end-users. While the inclusion of power and heat generators creates stronger incentives to switch to cleaner fuels, the "indirect accounting" to end-users puts more stress on the reduction of consumption to reduce emissions. Ideally, one should aim for an approach that induces full use of both types of reduction options.

A scheme that makes the power and heat sector directly responsible for carbon emissions in their production creates direct incentives for changes of input fuels. At the same time, by internalising the carbon value the price for which power and heat is offered to end users should adjust and therefore the correct incentives should also be created at the consumption stage, dependent obviously on demand elasticities and other factors that may obscure the price signal. This approach also appears to be compatible with the increasing integration of the gas and electricity markets at the European level.

A scheme that makes power and heat consumers (rather than producers) responsible for the emissions caused at the generation stage creates sound and direct incentives to cut consumption. However, it may be difficult in such a scheme to get the incentives at the generation stage right. Once electricity is fed into the power grid it is not possible to say anymore which fuel was used to produce which kWh. It needs to be determined how much carbon is embedded in the individual unit of power or heat consumed. Carbon emissions per kWh of power differ substantially with the fuel used to generate it. Some fuels are virtually carbon free or neutral (wind, solar, biomass). For fossil fuels the carbon emission factor differs considerably between gas, oil and coal.<sup>4</sup> If power and heat consumers are made accountable for emissions using the Member State-wide

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<sup>4</sup> The IPCC has fixed the following default carbon emissions factors for use in drawing up national inventories: 20 tC/TJ for crude oil, 26.8 tC/TJ for anthracite (coal), and 15.3 tC/TJ for natural gas.

average carbon emission factor per kWh produced by national utilities, the incentives to fuel switch are much reduced, since the individual power plant switching from a higher to a lower carbon fuel does not receive a direct and immediate reward. It is rather the entirety of power consumers – reflected in a slightly lowered carbon emissions factor and probably only after a time lag – who will be rewarded. Furthermore, the individual power plant shifting production or load from a lower to a higher carbon fuel is not directly held accountable. Another complication with the use of nation-wide average carbon emission factors is the increasing level of cross-border trade of power in the internal electricity market. While cross-border trade of electricity in the EU amounted only to 8 % of total generation in 1999, it is expected to increase. In Germany e.g. imports and exports of electricity increased by about 10% from 1999 to 2000. So it is to be expected that national averages will be less and less representative as time progresses and electricity markets integrate.

Given the low cost measure that fuel switching in the Community as a whole still offers, the choice about coverage of power and heat emissions may imply significantly higher or lower cost in fulfilling the Kyoto commitments. Higher cost would have an impact on society as a whole, and indirectly on the competitiveness of European industry.

## **8.6 The special case of small sources**

Small sources are of major importance for the European economy and may want to be part of any trading scheme that develops within the Community. Any threshold approach may give rise to distortion of competition between large and small sources, even within the same sectors. This can be problematic for other instruments of environment policy too, not just for emissions trading. Although the precedent for using such thresholds in EU environment policy is well established (e.g. 50MW threshold for the Large Combustion Plant Directive, as indicated above, or the EMAS Regulation), there will always be difficulties if competing entities suffer different outcomes.

It is suggested that the best way forward is to have a size threshold (possibly lower for the power and heat sector), and allow smaller sources to join a trading system voluntarily. Once a source has joined the trading scheme voluntarily, its decision would be irrevocable. However, other policies and measures should apply if these small sources do not opt to join emissions trading. Taxation would appear to be a particularly suitable policy instrument for small sources outside the trading system. It is important to get the level of stringency of policies and measures for small sources and/or size thresholds right. If the policies and measures are not sufficiently stringent, the setting up of smaller plants could be induced (equating to “leakage” from the trading scheme) with a negative environmental effect. If policies and measures for small sources would be more stringent, powerful incentives for these small sources to join the trading scheme voluntarily could be created.

## **8.7 CO<sub>2</sub> or all GHGs? A question of accuracy of monitoring**

Everyone agrees that robust monitoring is a desirable, even necessary, prerequisite for trading. Similarly, everyone agrees that 6-gas trading should be the

ultimate objective. Furthermore, the trading of Parts of Assigned Amount under the Protocol will use a 6-gas basket.

There are some industrial sources in respect on which non-CO<sub>2</sub> greenhouse gases are emitted to a significant extent, and can be measured with reasonable accuracy (e.g. N<sub>2</sub>O from the chemical sector, PFCs from the aluminium industry). Similarly, in certain limited circumstances, methane emissions may also be accurately monitored (e.g. waste and water treatment).

The possible policy line could be either that CO<sub>2</sub> is the “core” gas in the trading scheme, but that Member States can include other gases on condition that they can satisfy the Commission and other Member States that their monitoring capability is sufficiently robust. Alternatively, any of the greenhouse gases covered by the Kyoto Protocol could be covered by the trading scheme, but that their inclusion from particular sources would be conditional upon them meeting pre-determined standards of measurement.

## **8.8 Off-set projects**

One way of bringing into an emissions trading scheme sources and gases that may not be covered from the outset is by allowing credits from off-set projects to be used towards fulfilment of obligations under an emissions trading scheme. Joint Implementation and the Clean Development Mechanism are examples of such project off-sets within the context of the Kyoto Protocol. The practicalities of how credits from off-sets projects might be generated would have to be worked out, and it would be important that all Member States were comfortable with the robustness of such credits. Nevertheless, it would send the right signal to foresee the possibility of eventually incorporating such off-sets from the outset of an emissions trading scheme.

## **8.9 Conclusions**

More than other issues, the coverage of an emissions trading scheme depends on the point of regulation (“upstream”/“downstream”) and what other policies and measures are or may be put in place, both in respect of other sectors and other gases. Furthermore, in view of the potential to cut greenhouse gas emissions from power and heat, the coverage of these emissions and the setting of correct incentives deserves particular attention.

Definition of coverage of a trading scheme may be a case of “the best being the enemy of the good”. If we strive for too comprehensive a system to start off with, it may take too long to develop, and the window of opportunity for “learning-by-doing” between 2005 and 2008 may have been lost.