

Air Quality Legislation in the European Union

Bruno Giordan

bruno.giordan@pipsara.com

Summary: Starting from the 1979 UN Convention on Long Range Transboundary Air Pollution, the European Union has developed both sectoral and national clean air laws. These control individual coating and printing sectors, and set national ceilings for air pollutants from all sources. Some national targets will be very difficult to achieve, but are scheduled for review in 2004, with the Commission and Parliament looking for still lower ceilings. The coatings industry cannot challenge the political drive for cleaner air, or the academic work linking air pollution to human illness and ecological damage. What we can do, in addition to developing cleaner products and technologies, is to review critically the emissions data upon which the decisions on legislation are based. This data can be very poor. Industry needs to support CEPE's work on identifying and quantifying coatings emissions, their composition and the related costs.

Introduction

Over the last four years, Europe has introduced legislation covering almost all paints and printing inks sectors. The Integrated Pollution Prevention and Control (IPPC) Directive (EC 1996), the Solvent Emissions Directive (EC 1999) and the National Emissions Ceilings (NEC) Directive (EC 2001), together with the recent proposal for a product based Directive covering decorative and vehicle refinish paints, seem to represent the community's ambitions on the control of coatings emissions. The reality is more sombre. What we have seen is only a start.

The Convention on Long-range Transboundary Air Pollution

To understand the likely direction of future developments, we must start by looking at the history of the EU's air quality programme. In 1979, the UN ECE finalised a Convention on Long-range Transboundary Air Pollution (CLRTAP (UN 1979)). This led to a number of protocols, setting targets for the control of various pollutants. The first of these protocols to be directly relevant to our industry was the VOC protocol of 1991, which set a target of reducing VOC emissions by 30 percent by 1999, based on actual emissions in 1984/90. The problem was that there was little co-ordinated effort to set up regulations to meet this goal, and by the mid-1990s it was acknowledged by the EU that the target would not be achieved.

In the meantime, the science basis for the formation of tropospheric ozone had progressed significantly, and it was believed that larger reductions both in VOC and NO_x emissions would be needed to achieve the desired standards of air quality. This led to the Gothenburg protocol of November 1999, which set targets for all pollutants involved in acidification, eutrophication and tropospheric ozone. For the EU, the reduction in VOCs was no longer 30%, but 57%: from 15353 kilotons in 1990 to 6600 kilotons in 2010.

EU Directives

In parallel with these developments of the CLRTAP agenda, the EU had developed the IPPC Directive for larger emitters, and the Solvent Emissions Directive for most smaller contained processes. It is worth pausing at this point to look at what they aim to achieve.

a. The Integrated Pollution Prevention and Control Directive

The IPPC Directive controls coatings installations with the capacity to use 200 or more tonnes of solvent per annum. For these, it sets the requirement that the process must conform with best available technique (BAT). BAT has been carefully defined in the Directive. The definition of "available" in article 2 item 11 states:

'available' techniques shall mean those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages

On the face of it, this takes reasonable account of the costs of emissions control. I will return to this question below.

b. The Solvent Emissions Directive

Turning briefly to the Solvent Emissions Directive, it is noticeable that there is no mention here of BAT. There is little doubt that the Directive does in fact reflect BAT for some sectors -- automotive OEM and vehicle refinishing are examples. It must be questioned whether either of the alternatives offered to medium-sized (5 - 15 tonnes solvent use p.a.) metal coating business -- incineration or the use of coatings with an average solids:solvent ratio of 60:40 -- are economically viable. There is clearly a risk that some painting processes will be forced to move outside the EU, to countries with a more relaxed environmental regime. This

will not benefit the world ecosystem. And because air pollution is a transboundary effect, it will not even benefit the quality of air in Europe. It is significant that the UK, which has had local laws controlling VOC emissions for most of the last decade, is recording fewer severe ozone peaks, but a rising trend of background ozone concentration (NEG-TAP, 2001).

c. The NEC Directive

This Directive sets an overall VOC ceiling for the EU15 of 6500 kilotons -- slightly less than the Gothenburg ceiling. This total is apportioned between member states by a process that models the impact of the emissions, looking at the effects in 50 km squares that cover the whole territory of the Union. This means that lower ceilings are set for Member States if, for whatever reason, they have worse local pollution problems. The principle of BAT as a uniform standard must therefore be abandoned. Measures that are sufficient in Finland may be entirely unacceptable in Germany or Belgium. In fact, the ceilings are set in such a way that Germany, Belgium, probably the Netherlands and Denmark, must implement controls that go much further than BAT.

d. The next step

If the NEC Directive places a heavy burden on industry, we must also recognise that the limit of 6500 kilotons in 2010 was only accepted by the Commission with the greatest reluctance. The modelling studies showed that the target to achieve the desired air quality standards should be 5500 kilotons. There will be a review of the ceiling values in 2004, and the review process will start in the next months.

It is important to recognise that there is no separate ceiling for the coatings industry. The further reduction of 14% on average could well be achieved by tightening the regulatory screws on whichever sector -- coatings, traffic, household products -- offers the least resistance. Certainly, our industry will be competing with others for every tonne of emissions. The correct approach, of course, is to require reductions first of all in the sector faced with the lowest costs -- that is, the lowest cost of abatement per tonne of solvent. By doing this, the costs to society will be minimised, and all sectors with a positive payback will be regulated first. It is, however, unrealistic to expect this to happen automatically. The summary of recent history above shows that there has been little systematic effort either by the authorities or by our own industry to generate realistic cost data. By contrast, it is instructive to look at progress on transport emissions (the "Auto-Oil" programme), where industry does seem to have been more active and successful.

How should industry respond?

a. Emissions Inventory Data

Air quality legislation is based on emission inventories. Anthropogenic VOC emissions come from traffic, coatings, other industry solvent uses, and from household products. Data is collected by national authorities, who also forecast the future trend of emissions.

Our first problem is the quality of this data. The NEC Directive was based on official data that took no account of industry sales statistics. Industry statistics are excellent measure of local use, and hence of potential emissions. When the UK carried out a revision of both historical data and forecasts taking account of this source of data, it was seen that 2010 predictions in particular had been seriously overestimated (table 1).

Table 1. UK VOC emissions from coatings, industry (BCF) data compared with that used for the Gothenburg protocol (RAINS¹)

Coatings using sector	Net VOC emissions (tonnes)				
	BCF	RAINS	BCF	BCF	RAINS
	1990	1990	1998	2010	2010
Architectural use of paints	26500	23719	22500	15000	20332
Domestic use of paints	38854	26294	26970	12000	23003
Vehicle refinishing	23000	21662	13000	8600	10400
Manufacture of automobiles	10400	25522	7700	1600	10295
Other industrial use of paints	101285	101807	66000	44900	60825
Printing, offset	10560	3740	4236	1580	4150
Rotogravure in publication	3175	3561	1257	700	2522
Screen printing	2610	6586	2600	500	9667
Flexography and rotogravure in packaging	11520	26273	11867	2200	27139
Totals	227904	239164	156129	87080	168331

To date, however, only Germany and the UK have carried out a thorough review of the data, taking account of industry statistics. We only have partial data for specific coatings

¹ 'Regional Air Pollution INformation and Simulation' – further details on <http://www.jiasa.ac.at/~rains/index.html>

subsectors for other Member States, but these show that the errors in the UK inventory data are likely to be quite typical for the EU15 as a whole.

It is also worth mentioning that the speciation data – the breakdown of the emissions into their individual components – is particularly unsatisfactory.

This means that the modelling studies that led to the Gothenburg protocol, and hence to the NEC Directive, may themselves be deeply flawed, as they are based on significantly inaccurate data. For the 2004 review of the Directive, we must do all that we can to ensure that the quality of the data is improved. Time is short, as the review is about to start, and we still do not have data for most EU15 Member States. Unless we treat this with a greater urgency, we will miss our chance, and risk serious structural damage to our industry.

b. Abatement Costs

Ideally, the reduction of emissions should be achieved by tackling first those for which the abatement costs are lowest. By proceeding in this manner, society ensures that the benefits of cleaner air are obtained at the lowest overall cost. We should question the validity of measures whose cost exceeds their benefit.

In this context, we need to look at costs and benefits from the point of view of society as a whole. Of course, an enterprise faced with installing BAT sees only the costs, but the community sees the benefits. These benefits come in a variety of forms. Purer air means less illness, and less premature death. It means that agricultural crops and trees are healthier, and there is less photochemical damage to, for example, painted structures. All of these benefits can be costed. The EU's ExternE research programme has developed comprehensive values for the benefits to society from reduced pollution (see <http://externe.jrc.es/>). Using these, Dr Holland and his team at AEAT have estimated that the abatement of one tonne of VOC emissions is worth about €2000 annually (AEAT 2002). From a knowledge of investment and running costs of abatement measures, it is then easy to calculate the payback for an individual installation.

Or lack of one. The problem lies not with the IPPC Directive -- who could oppose the adoption of BAT, taking due account of economic considerations? No, the problem lies with the NEC Directive. As explained above, this requires reductions unrelated to BAT.

There is no value to industry in challenging the political agenda – we all want clean air for ourselves and our children to breathe. What industry must do is to ensure that the basic emissions data is as accurate as possible, and that the real costs of abatement are properly documented.

Conclusions

Clean air is an ongoing project for the EU, and we can expect more regulatory initiatives. Industry must prepare itself with data on emissions and on the costs of control. Further regulation is inevitable, but we can help ensure that this is only introduced when it is properly justified.

References

- AEAT 2002: AEAT. Forthcoming. Database of Externalities of Air Pollutants. Report prepared for the European Commission, DG Environment.
- EC 1996: Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control (OJ L L 257, 10/10/1996)
- EC 1999: Council Directive 99/13/EC on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations (OJ L 85, 29.3.1999)
- EC 2001: Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants (OJ L 309, 27.11.2001)
- NEGTA 2001: Transboundary Air Pollution: Acidification, Eutrophication and Ground-level Ozone in the UK, National Expert Group on Transboundary Air Pollution 2001
- UN 1979: 1979 Geneva Convention on Long Range Transboundary Air Pollution