STOP ACID RAIN

Environmental Factsheet
No. 5, December 1994

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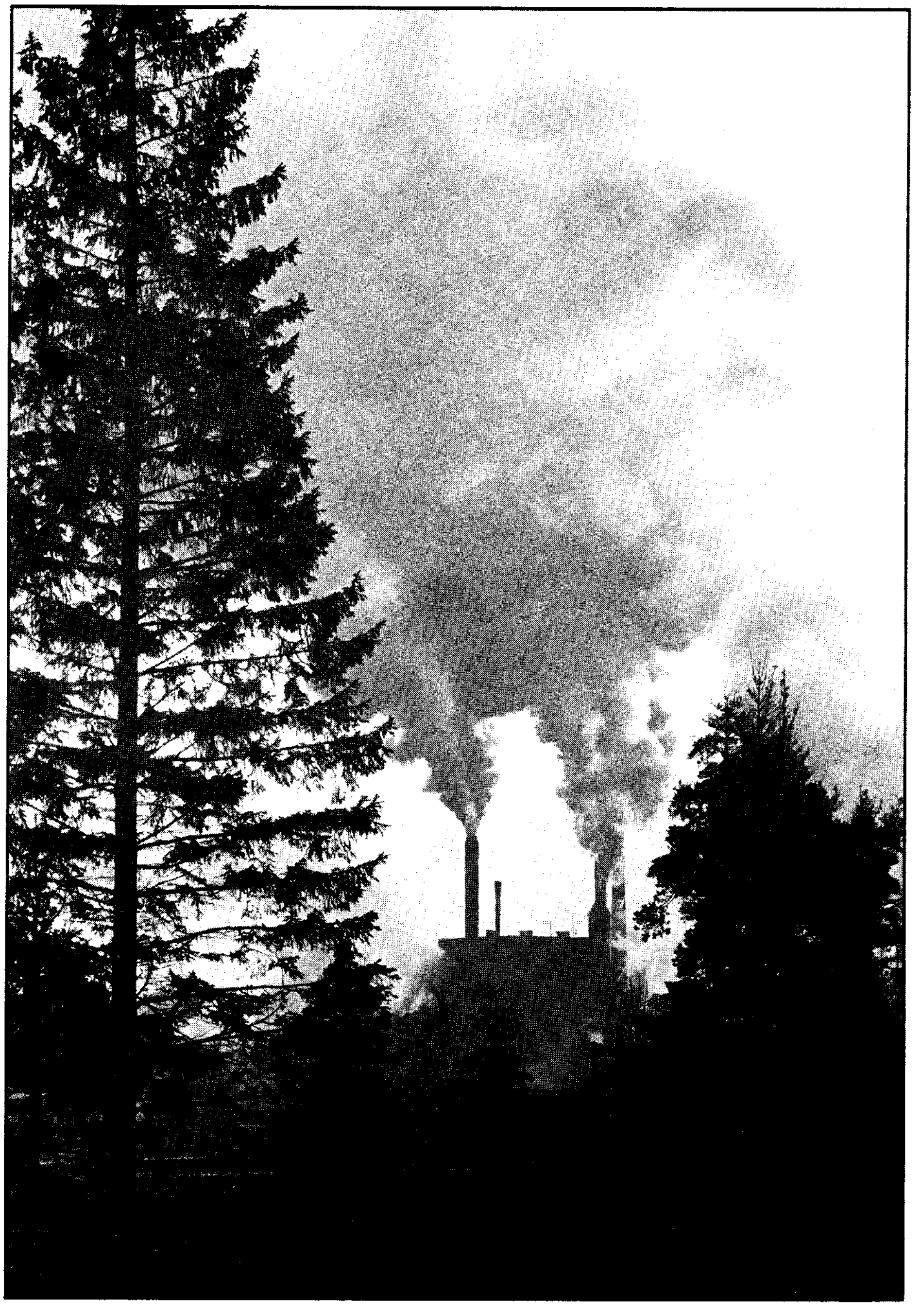
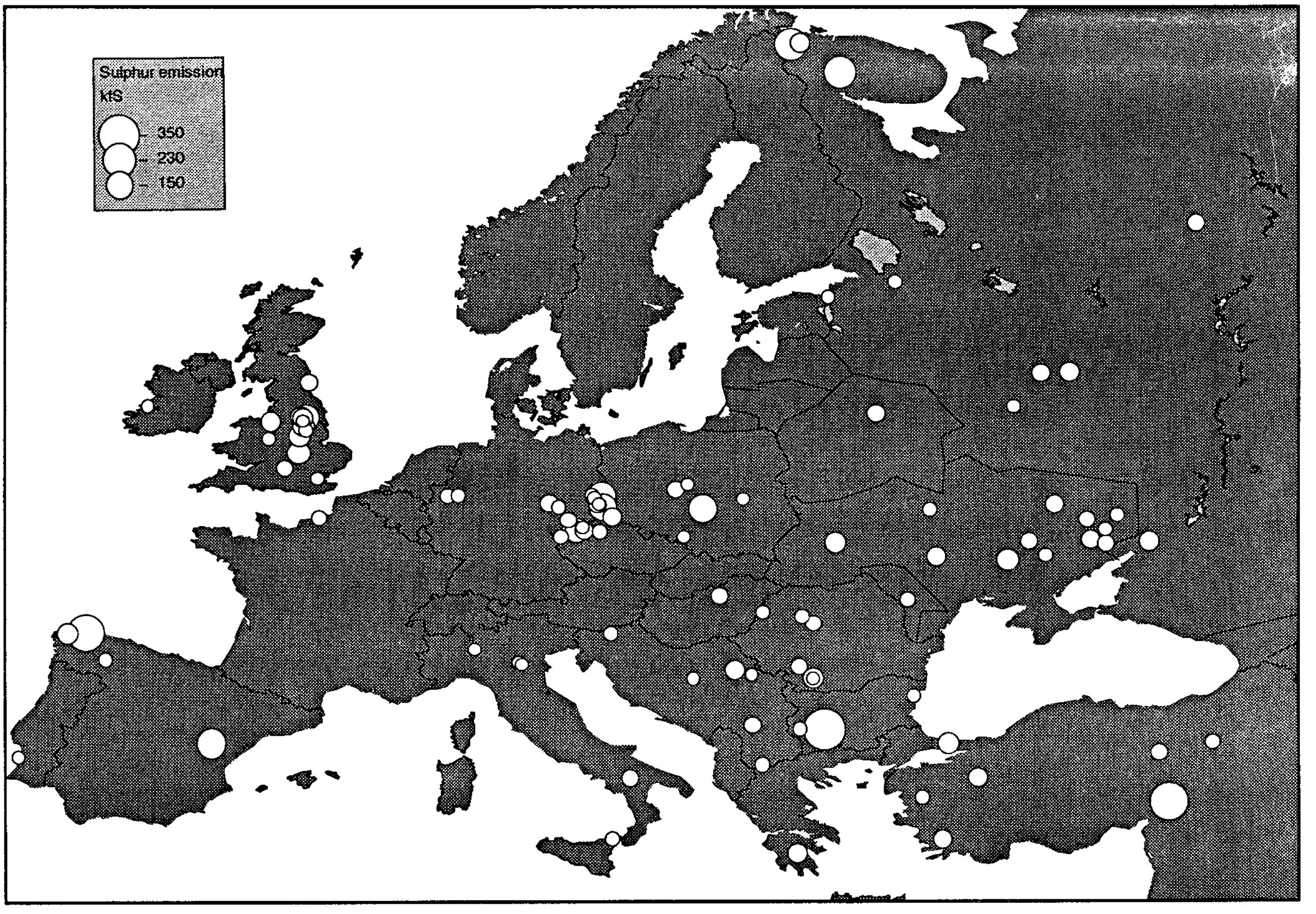


The 100 worst emitters

A RECENT STUDY* HAS SHOWN that a greater part of the emissions of sulphur dioxide in Europe comes from a relatively small number of sources. The hundred worst ones are responsible for almost half the total.

The study covered forty or so countries, including several that have been or still are in a state of radical change, both political and economic. Most of the emission data relates to the period from 1990 to 1992. As a result of the downturn in production from heavy industry in eastern Europe, combined with a shift to natural gas and imported coal in some western countries, major changes are occurring in emission patterns. And because of these changes, the data may not always reflect the actual situation



now, in 1994. Moreover the rapid changes make it difficult to compare, for instance, the information from the study database with the emission data from the United Nations Economic Commission for Europe (UN ECE).

The emissions come from four sources: power stations, industrial plants, oil refineries, and district heating installations. Since there was no database covering all of them, information had to be obtained in various ways in order to be able to pinpoint the sources and estimate their emissions. Among the means employed were questionnaires to utilities and government institutions.

The study not only revealed the hundred worst polluters, but also enabled a database to be built up with information on more than a thousand point sources. A map (above) could be made, too, showing the location of the hundred worst emitters.

About 80 per cent of the man-made emissions of sulphur in Europe were shown to come from the one thousand point sources mentioned, the hundred worst ones alone emitting 42 per cent of the total. Of that hundred, ninety-three are power stations, together with three smelters, two petroleum refineries, a blast furnace producing pig iron, and one manufacturing plant. In the report, these hundred have been ranged according to the size of their emissions and the country of their location.

Since the ninety-three power stations are all fired with fossil fuel, estimates have also been made of their emissions of carbon dioxide. Expressed as carbon, these amounted altogether to 198 million tons.

Considered per ton of reduced pollutant, it is often cheaper – assuming the use of conventional technology for flue-gas desulphurization – to retrofit large plants rather than small ones, and by concentrating on large plants, emissions could be brought down quickly and cost-effectively. This should make it the prime aim when formulating strategies.

It may at least be of theoretical interest to make a rough estimate of the cost of bringing about an improvement by installing modern flue-gas desulphurization equipment at the hundred biggest sources of emission – since that should give some idea of the upper limit to the actual cost of emission control.

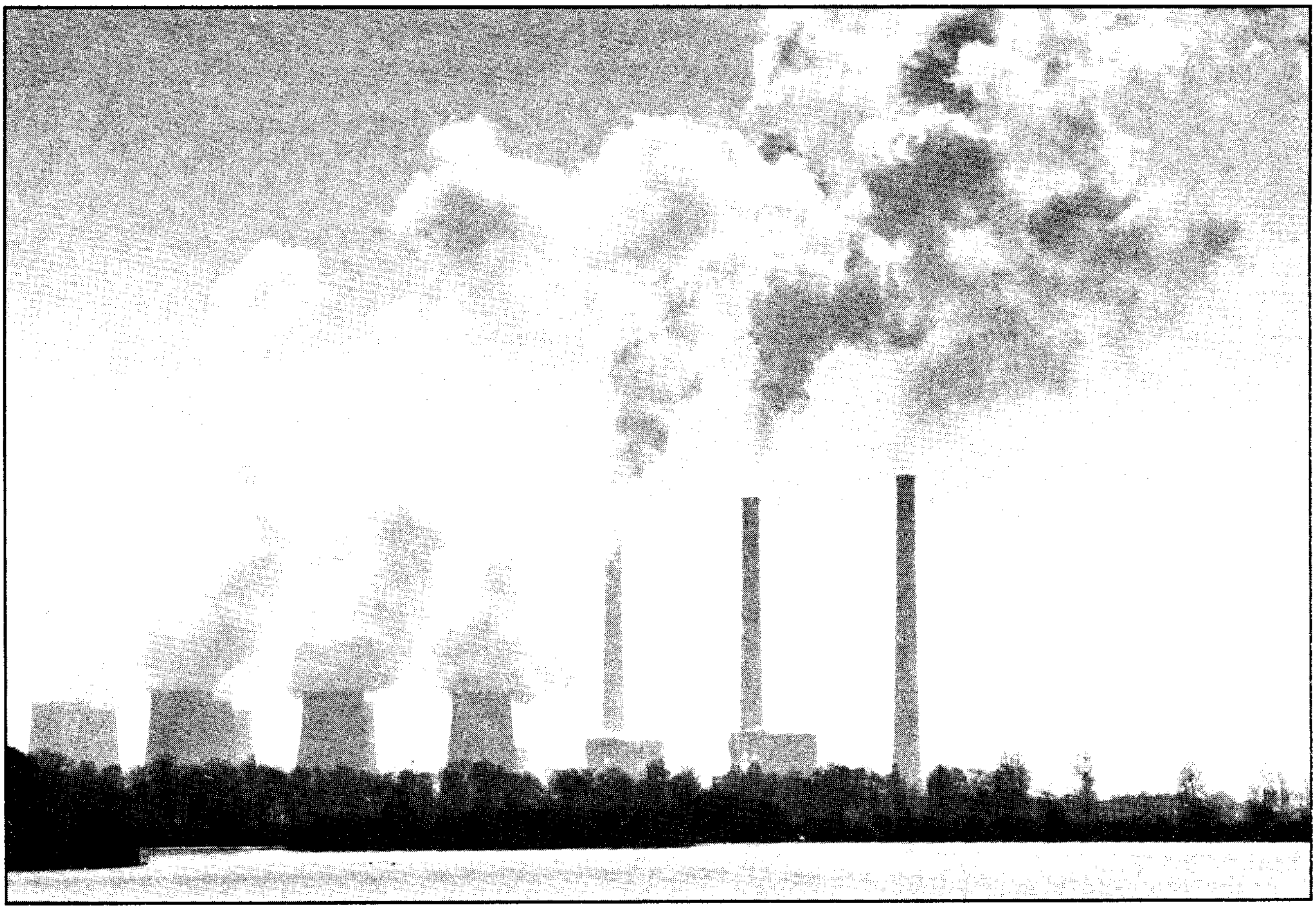
The ninety-three power stations in the "big hundred" have a combined electrical capacity of 138 gigawatts. The capital cost of equipping them for flue-gas desulphurization would amount to US$30 billion. The reduction of sulphur emissions would be about 6.2 million tons, or some 38 per cent of the European aggregate. The total annual cost would be about US$4.3 billion.

Often, however, conventional end-of-pipe measures are neither the best nor the cheapest option for emission control. This is especially

The hundred largest European emitters of sulphur

	Name of plant	Type	Location	Emission (ton S)		Name of plant	Type	Location	Emission (ton S)
1.	Maritsa East	PS	Bulgaria	350,000	51.	Cherepetskaya	PS	Russia	53,000
2.	Afsin-Elbistan	PS	Turkey	288,000	52.	Kremikovtsi	PI	Bulgaria	53,000
3.	Puentes (As Pontes)	PS	Spain	271,000	53.	Didcot	PS	United Kingdom	51,000
4.	Montsegorsk	Sm	Russia	212,000	54.	Chemnitz	PS	Germany	51,000
5.	Nikel	Sm	Russia	211,000	55.	Ludus	PS	Romania	51,000
6.	Teruel	PS	Spain	183,000	56.	Porcheville	PS	France	50,000
7.	Belchatow	PS	Poland	168,000	57.	Slavyanskaya	PS	Ukraine	49,000
8.	Jänschwalde	PS	Germany	157,000	58.	Moldavia	PS	Moldavia	47,000
9.	Boxberg	PS	Germany	149,000	59.	Fortuna	PS	Germany	47,000
10.	Prunerov	PS	Czech Rep.	137,000	60.	Bitola	PS	Macedonia	46,000
11.	Drax	PS	United Kingdom	132,000	61.	Luganskaya	PS	Ukraine	44,000
12.	Cottam	PS	United Kingdom	98,000	62.	Melnik	PS	Czech Rep.	44,000
13.	Tusimice	PS	Czech Rep.	98,000	63.	Turceni	PS	Romania	43,000
14.	Krivorozhskaya	PS	Ukraine	95,000	64.	Mintia	PS	Romania	43,000
15.	Burshtynskaya	PS	Ukraine	92,000	65.	Soma	PS	Turkey	43,000
16.	Ratcliffe-on-Soar	PS	United Kingdom	90,000	66.	Tisova	PS	Czech Rep.	43,000
17.	Meirama	PS	Spain	90,000	67.	Milazzo	Ref	Italy	43,000
18.	Yenikoy (Yentes)	PS	Turkey	89,000	68.	Bobovdol	PS	Bulgaria	43,000
19.	Ferrybridge	PS	United Kingdom	86,000	69.	Uglegorskaya	PS	Ukraine	42,000
20.	West Burton	PS	United Kingdom	85,000	70.	Sostanj	PS	Slovenia	42,000
21.	Fiddler's Ferry	PS	United Kingdom	80,000	71.	Compostilla	PS	Spain	42,000
22.	Novocherkasskaya	PS	Russia	80,000	72.	Tripolskaya	PS	Ukraine	41,000
23.	Lodyzhinskaya	PS	Ukraine	80,000	73.	Gerstein	PS	Germany	41,000
24.	Isalnita	PS	Romania	79,000	74.	Lubbenau	PS	Germany	41,000
25.	Zapoljarnyj	Sm	Russia	79,000	75.	Belovskaya	PS	Russia	41,000
26.	Nikola Tesla	PS	Yugoslavia	78,000	76.	Zaporozhye	PS	Ukraine	41,000
27.	Ryazanskaya	PS	Russia	76,000	77.	Kirishi	PS	Russia	40,000
28.	Megalopolis	PS	Greece	76,000	78.	High Marnham	PS	United Kingdom	39,000
29.	Eggborough	PS	United Kingdom	73,000	79.	Espenhaim	PS	Germany	39,000
30.	Irini	PS	Greece	72,000	80.	Rosanno	PS	Italy	38,000
31.	Turow	PS	Poland	72,000	81.	Oradea	PS	Romania	38,000
32.	Seyitomer (Somtes)	PS	Turkey	72,000	82.	Vetschau	PS	Germany	38,000
33.	Zmiyevskaya	PS	Ukraine	70,000	83.	Varna	PS	Bulgaria	38,000
34.	Kurakhovskaya	PS	Ukraine	69,000	84.	Balti	PS	Estonia	37,000
35.	Yatagan (Yates)	PS	Turkey	68,000	85.	Ironbridge	PS	United Kingdom	37,000
36.	Lukomyl	PS	Russia	68,000	86.	Tuzla	PS	Yugoslavia	37,000
37.	Thierbach	PS	Germany	65,000	87.	Sines	PS	Portugal	36,000
38.	Kashiri	PS	Russia	64,000	88.	Rovinari	PS	Romania	35,000
39.	Pocerady	PS	Czech Rep.	63,000	89.	Schwarze Pumpe	PS	Germany	35,000
40.	Lippendorf (Bohlen)	PS	Germany	63,000	90.	Moneypoint	PS	Ireland	34,000
41.	Matra	PS	Hungary	60,000	91.	Kingsnorth	PS	United Kingdom	34,000
42.	Blyth	PS	United Kingdom	60,000	92.	MZRP Plock	Ref	Poland	34,000
43.	Starobeshevo	PS	Ukraine	58,000	93.	Drmno	PS	Yugoslavia	33,000
44.	Pridneprovskaya	PS	Ukraine	57,000	94.	Kozienice	PS	Poland	33,000
45.	Brindisi Sud	PS	Italy	57,000	95.	Chemopetrol	Pro	Slovakia	33,000
46.	Kangal	PS	Turkey	56,000	96.	Rybnik	PS	Poland	33,000
47.	Zuevskaya	PS	Ukraine	55,000	97.	Ostiglia	PS	Italy	32,000
48.	Adamow	PS	Poland	55,000	98.	La Casella	PS	Italy	32,000
49.	Kosovo	PS	Yugoslavia	54,000	99.	Sermide	PS	Italy	32,000
50.	Hagenwerder	PS	Germany	54,000	100.	Thorpe Marsh	PS	United Kingdom	31,000

PS = power station, PI = pig iron plant, Pro = process emissions, Ref = refinery, Sm = smelter



Eighth among the worst: the Jänschwalde power station in eastern Germany.

so in the case of older installations that are likely to be shortly closed down. Other measures, such as making more efficient use of energy, can lead both to a direct reduction of emissions and a more rapid closure of plants.

A change of fuel – for example, from high-sulphur coal or oil to low-sulphur kinds, or to gas or biofuel – offers another possibility for reducing, quickly and cheaply, the emissions from existing plants.

Yet another option is to replace old, polluting plants with new, more efficient and less-polluting ones. If conventional fossil fuels (coal, oil, natural gas) still had to be used, reduction of the emissions of sulphur and nitrogen oxides could be secured by adopting the best available techniques.

Preferably, however, renewable sources of energy should, to the largest extent possible, be taken into use instead.

* **Sulphur emission from large point sources in Europe.** Second revised edition, November 1994. By Mark Barrett and Rodri Protheroe, Pollen Consultancy, Colchester, England. Can be had from the publishers, the Swedish NGO Secretariat on Acid Rain, Box 245, S-401 24 Göteborg, Sweden.