

Other services



The private hospital treatment sector is undergoing major changes and is faced with three main phenomena: the increase in the average age of the population which causes changes in the level and nature of requirements, the decrease in intervention by the state authorities in the subsidising of health care, and finally a requirement for the capital to meet the growing sophistication in medical technologies.

Given this need for substantial investment, we are witnessing an increase in the size of hospitals on the one hand and on the other a regrouping of healthcare.

Sector definition

The private hospitalization sector covers all organisations designed to provide accommodation and run by private authorities.

Private hospital care can be broken down into five activity sectors:

- the largest is that dealing with critical care or short stays such as obstetrics, surgery, internal medicine and pediatrics. This activity is concentrated in general hospitals or specialised hospitals;
- the psychiatric sector deals mainly with psychiatric hospitals and partly with the neuropsychiatry departments of general hospitals;
- the geriatric or chronic long stay illnesses

sector is divided into certain non-hospital, long stay services and non-hospital services (home);

- the rehabilitation sector;
- the convalescence and thermal cures section, as well as rest homes for the elderly and nursing homes. These sectors are excluded from hospital statistics.

At the present time, neither statistics nor definitions refer to the same ideas in all the Community Member States. This makes the study of this sector particularly delicate. This monograph has concentrated on an analysis of private hospital care for critical care in general hospitals.

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Table 1
Private hospitalization - Total health costs in 1987
Health care, research, general management, public investment and prevention

| | % of GDP | Total cost per inhab. (ECU) | Price index of hospital care in 1987 (Indice 100=1980) |
|-----------------|----------|-----------------------------|--|
| Belgique/België | 7.2 | 658.0 | 163.6 |
| Danmark | 6.0 | 593.0 | 173.4 |
| BR Deutschland | 8.2 | 819.0 | 146.3 |
| Hellas | 5.3 | 252.0 | 407.8 |
| España | 6.0 | 390.0 | 212.0 ⁽¹⁾ |
| France | 8.6 | 817.0 | 163.8 |
| Ireland | 7.4 | 420.0 | 160.3 |
| Italia | 6.9 | 630.0 | 237.0 |
| Luxembourg | 7.5 | 787.0 | N/A |
| Nederland | 8.5 | 780.0 | 122.0 |
| Portugal | 6.4 | 289.0 | 303.0 ⁽¹⁾ |
| United Kingdom | 6.1 | 568.0 | 156.3 |
| USA | 11.2 | 1 537.0 | 160.3 |
| Japan | 6.8 | 685.0 | 120.7 |

⁽¹⁾ 1986
Source: OECD: Health systems 1990
1987 statistics unless otherwise indicated

Sector financing

The main source of revenue for the sector is the country's Social Security or Health Authority. This either pays the cost of the care directly to the clinic and/or the supplier of the care, or reimburses all or part of the care to the patients themselves.

Table 1 shows total health costs per inhabitant for the various Community countries.

The cut-backs in Social Security subsidies has resulted in a decreased supply of services in the hospital care sector: wards

have been closed; less major equipment is installed; waiting lists are drawn up, etc.

In addition, there is the promotion of alternative health care without hospitalisation.

The people of each Member State are not all covered to the same extent by Social Security (Table 2).

In Belgium, Luxembourg and the Netherlands, private and public hospitals participate on equal footing in the hospital service and Social Security payment is calculated in the same way.

In France, Germany and Italy, the private

hospital can choose between integration into the public service, working on scale charges or staying out of the system. The patients who choose to apply to a private hospital outside the system will only be partially reimbursed for their expenses. In Greece, Ireland and Portugal, the patient who chooses a private clinic receives a lump sum, which is sometimes small, from the Social Security. In the United Kingdom, patients who receive health care outside the National Health Service pay all expenses, unless the NHS decide to cover these in the event that it is impossible to put the patients in an NHS hospital.

In all cases the patient may be liable for some contribution even when the legal scale charge system is introduced (daily lump sum, or personal participation in medical examinations and medicines). Moreover, in some countries, the citizen with an income over a certain level is not covered by the Social Security health care programme (Netherlands, Germany). Patients can cover these personal contributions by health care insurance, either commercial, non profit-making or mutual benefit, especially in the case of Germany (5 500 000 insured), United Kingdom (5 500 000 insured), Ireland (500 000 insured), Denmark (500 000 insured), Italy, Spain (6 000 000) and the Netherlands.

The insurance companies become major interlocutors of the private clinics and even invest in private clinics for their customers.

Sector activity

Private hospital activity includes medical and paramedical facilities, medicine distribution, lodging and nursing surveillance. Rapid technical progress (lithotomy, laser surgery, transplants, cardiographs, scan-

Table 2
Private hospitalization - Financing of hospital costs covered by patients, 1987

| | Hospital costs covered by public health insurance (%) | Population reimbursed for hospital care by health insurance (%) |
|-----------------|---|---|
| Belgique/België | 98 | 68 |
| Danmark | 100 | 100 |
| BR Deutschland | 92 | 97 |
| Hellas | 100 | 90 |
| España | 98 | 84 |
| France | 99 | 92 |
| Ireland | 100 | 95 |
| Italia | 100 | 99 |
| Luxembourg | 100 | 95 |
| Nederland | 77 | 80 |
| Portugal | 100 | 100 |
| United Kingdom | 100 | 99 |
| USA | 40 | 55 |

Source: OECD: Health systems, 1990

Table 3
Structure of professional general hospitals
sector in the EC

| N° of critical care hosp. | N° of beds | | N° of days | | | Admissions | | length of stay | attendance rate | |
|---------------------------|------------|----------------------|-------------------------|---------|-----------------------------|----------------------------|---------------------------|-------------------------|---------------------|------|
| | Total | G.H.(¹) | Total | G.H. | Total | G.H. | Total | crit. care | crit. care | |
| Belgique/België public | 152 | 139 | 34 688 | 27 416 | | 8 612 302 | 683 867 | 671 532 | 13 | 86.1 |
| private | 253 | 175 | 53 866 | 34 655 | 27 117 742 | 11 156 677 | 1 107 693 | 1 058 320 | 11 | 89.4 |
| Germany public | 1 073 | 769 | 339 365 | 252 801 | 106 828 433 | 78 474 595 | | 6173203 | 13 | 85.0 |
| ASBL | 1 044 | 730 | 235 671 | 188 692 | 75 183 335 | 59 635 490 | | 4353608 | 14 | 86.6 |
| professional | 954 | 282 | 98 651 | 17 638 | 30 902 040 | 5 440 959 | | 408707 | 13 | 84.5 |
| Danmark public | 114 | | 32 325 | | 9 574 000 | | | | N/A | N/A |
| professional | 1 | 1 | 75 | | | | | | | |
| España public | 387 | | 128 721 | | | | | | | |
| ASBL | 146 | | 26 005 | | | 29 035 919(²) | | 2 149 038 | (²) 14 | |
| professional | 366 | | 31 325 | 24 642 | | 5 585 476 | | 780 586 | 7 | 62.1 |
| France public | | 867 | | 194 526 | | 50 743 811 | | 6446673 | 8 | 71.5 |
| ASBL | | 307 | 568 905(³) | 40 044 | 108 200 000(³) | 10 074 680 | | 1002101 | 10 | 68.9 |
| professional | | 1 073 | | 77 407 | | 25 488 029 | | 3425335 | 7 | 90.2 |
| Hellas public | 209 | | 36 604 | | | | | | | |
| private | 279 | 241 | 16 260 | 12 380 | | | 1 202 000(⁴) | | N/A | |
| Italia public | 1 117 | | 362 417 | 319 529 | | 78 537 370 | | 8 396 075 | 9 | 67.3 |
| private | 742 | | 76 726 | 60 130 | | 16 899 000 | | 1953000 | 9 | 77.0 |
| Ireland public | 92 | | | 13 700 | | 3 800 000 | | 507 000 | 8 | 76.0 |
| ASBL | 16 | | | 1 636 | | 404 250 | | 53 192 | 8 | 67.7 |
| professional | 2 | | | 181 | | | | | | |
| Luxembourg public | 7 | | | 1 571 | | 459 245 | | 40 170 | 11 | 80.1 |
| ASBL | 10 | | | 1 061 | | 296 473 | | 24 251 | 12 | 76.6 |
| professional | 1 | | | 77 | | 19 963 | | 3 384 | 6 | 71.0 |
| Portugal public | | 84 | | | | | | | | |
| private | | 45 | | 1 667 | | N/A | | | N/A | N/A |
| United Kingdom public | | 1 600 | | 407 711 | | | | 5 849 000 | 8 | 76.0 |
| ASBL | | 79 | | 4 477 | | | | | | 55.0 |
| professional | | 110 | | 5 426 | | 1 931 000(⁵) | | 287 000(⁵) | 6.7(⁵) | 97.5 |

(¹) General Hospitals

(²) Public and ASBL

(³) Public and ASBL and professional

(⁴) Public and private

(⁵) ASBL and professional

Source: CEHP

ners, nuclear magnetic scanning, etc.) has increased the type and quantity of medical services. Thus medical and diagnostic services (surgery, obstetrics, dialysis, radiotherapy, laboratory analyses and medical images) are becoming increasingly important in the hospitals' total turnover. Alternatively, "secondary" activities such as lodging, are in decline. The rise in short stay admission numbers confirms this trend. Increasingly, hospital stays are confined to the critical therapeutic period and are

therefore very costly in terms of personnel and resources. The general decline in the length of hospital stays (except in Germany, Luxembourg and Greece) is sometimes enforced by the authorities in charge. Thus, in Belgium a standard quota of days is assigned to each public and private institution. In Italy private scale charge clinics can not exceed the number of hospitalisation days corresponding in each clinic to the number of scale charge beds. The regulations in each country have more-

over forced the closure of public hospitals and private clinics which do not possess a minimum number of beds (Belgium, Italy, the Netherlands, Germany). This tendency has resulted in the disappearance of very small units, in particular maternity units. The average number of beds per public and private institution has therefore risen. Generally, the Member States authorities exert pressure for an overall decrease in the number of beds and days, except in Portugal and Greece. Day hospital care, enabling the patient to

Table 4
Average number of beds
per general hospital, 1989

| | Public | Private |
|---------------------------------|---------------------|---------------------|
| Belgique/België | 197 | 198 |
| Danmark | (¹)283 | 75 |
| BR Deutschland (²) | (¹)316 | 204 |
| Hellas | (¹)175 | (¹)58 |
| España | (¹)332 | (¹)112 |
| France | 224 | 85 |
| Italia | 324 | (1)103 |
| Luxembourg | N/D | N/D |
| Nederland | N/D | N/D |
| Portugal | N/D | 37 |
| United Kingdom | 254 | 52 |

(¹) Total hospitals

(²) 1988

Source: CEHP

be sent home after a mild operation is slowly spreading in the EC and its development is linked to regulations and finance. In parallel, institutions which provide care for chronically ill patients and the elderly have had a sharp increase, corresponding to rising needs. They are now up to saturation point linked to pressure for home care. The same phenomenon can be observed in psychiatric care insofar as this sector depends on joint responsibility budgets. This market for new forms of non-medical lodging (homes, nursing homes, care in one's own house...) is accessible to private initiative.

Evolution of intra and extra-Community consumption

❖ Intra-Community: It is difficult to assess exports of health care, i.e. facilities for the benefit of non-residents, when they pay for this themselves.

The export of health care payable by So-

cial Security organisations is limited by Community regulations to the case of migrants and patients residing near borders, emergency care during trips (E111) and cases where treatment is authorised, being unavailable in the State of residence (E112). This last trend is particularly towards high technology health care institutions: cardiac surgery, cancer, transplants. Some countries, like Denmark and to a certain extent the Netherlands, practice a policy of exporting very specific cases (cardiac surgery).

The global flow of intra-Community health care in 1988, hospital care and outpatient care combined, financed by the Member States for non-residents during occasional stays, is shown in Table 6.

❖ Extra-Community: Private clinics receive an important volume of patients, either covered by international agreements or by individual financing, mainly owing to historic relationships with extra-Community countries: Libyans in Italy, Algerians in France, Africans in Belgium, South Americans in Spain. This movement of patients is especially towards highly specialised clinics (ophthalmology in Barcelona, cardiac surgery in London...) but not exclusively.

Italy, within the framework of international Social Security agreements, provided, in 1987, treatment costing 3 295 million Lire for 4 710 non-Community foreigners, mainly Austrians and Yugoslavs.

Table 5
Private hospitalization - Number of cases treated by day hospitalization, 1987

| | F | IRL | NL | UK |
|---------|-----------|--------|---------|-----------|
| Total | 4 324 871 | 32 100 | 274 000 | 1 472 000 |
| Private | 1 376 475 | 6 000 | N/A | 216 000 |
| Public | 2 948 396 | 26 100 | N/A | 1 256 000 |

Source: CEHP

Employment evolution

It is estimated that the level of personnel required in a private hospital is about 1.5 people per bed, including at least 0.5 qualified nurses (Table 7).

Human resources represent 65 - 70% of the cost of professional profit-making private hospital care. The medical statistics are difficult to research as the measurement unit is the function, i.e. a specific activity in the hospital. In the Netherlands, moreover, hospitals are not classified into services or departments, but depending on their functions and programming does not list services but the number of specialised doctors.

All the Community clinics are faced with a serious shortage of qualified nursing personnel. A strong appeal to extra-Community personnel has been made mainly to the Philippines (in Spain) and the Eastern European countries (Greece, Italy).

Structure of the sector

The structure of the private hospitalization sector is evolving. Initially, the private clinic was often set up by a medical practitioner or a group of practitioners helped by their close associates. At present, the need for investment in high technology and increased capacity is forcing clinics to seek new partners.

Several private hospital chains run by financial groups or insurance companies have been established within the EC. The largest is the French chain Compagnie Générale des Eaux. It has acquired through the American chain, American Medical International, 18 institutions situated in England (for 2.32 billion French Francs) and thus becomes, with a turnover of 3 billion FF and 60 institutions, the foremost chain in the EC.

Table 6
Private hospitalization
Care for border residents and foreign residents (E 106), 1988
(in ECU)

| (ECU) | Total services | Main beneficiaries | |
|-----------------|----------------|--------------------|----------|
| Belgique/België | 39 385 196 | NL | 12471070 |
| | | UK | 502933 |
| | | I | 12159659 |
| France | 139 157 304 | I | 75924996 |
| | | D | 30203020 |
| | | UK | 4064176 |
| Italia | 14 467 778 | D | 9548000 |
| | | F | 2491000 |
| | | UK | 679000 |
| Luxembourg | 2 611 610 | F | 834360 |
| | | B | 675157 |
| | | D | 310232 |
| | | I | 287675 |
| | | UK | 31987 |
| Nederland | 13 571 864 | I | 630789 |
| | | D | 592573 |
| | | B | 6234536 |
| | | GR | 162439 |
| Portugal | 413 729 | B | 91360 |
| | | NL | 17518 |
| United Kingdom | 108 881 242 | GR | 169271 |
| | | I | 365829 |

Source: Association Internationale des Mutualités 1990

The German chain Paracelsus, established in the United States, has acquired 4 clinics (800 beds) in France and 3 in the United Kingdom (200 beds).

The insurance companies are also large investors: the private hospital chain of the English company BUPA is well established in the United Kingdom, Spain and Ireland.

The Italian chains FONDARIA and SAI are also sizeable. In Spain, the company Previaisa plans to install 2 000 beds in 1992.

In parallel, a spirit of business and marketing is appearing among the directors of

professional clinics. A new approach is aiming at increasing productivity in hospital outlay faced with the restructuring of health expenditure. Private clinics are becoming familiar with quality evaluation (CEHP recommendation, 1989), management audits and marketing. The public sector is also adjusting to this trend. The importance of medical techniques is growing. In 1990, the private clinic is a true alternative and no longer leaves the sector with the monopoly of capital intensive care.

Outlook

A gradual trend to disperse patients, entered on a waiting list, around a network of highly specialist Community hospitals (major burns, transplants) is likely. Facilitating the access to private health care to managerial staff migrating to countries where official hospital care is not sufficient to meet demand is also probable. Extra-territorial medical care may be established aimed at patients not requiring official financial help. Private hospital care already responds fully to extra-Community demands and the creation of a services clause in the GATT could facilitate reception and payment from patients from outside Europe. Furthermore, there is strong demand in the Eastern countries for a system of free choice. This could result in further private hospital care as an extension to the system.

- The factor which will decide the evolution of private hospital care will be the possibility, judicial and economic, of investing in increasingly sophisticated and expensive equipment, which is necessary to maintain a role as an alternative. The development of critical health care techniques will result in a decrease in beds and number of hospital days needed.
- The increase in unit size appears unavoidable, despite the uncertainty regarding economies of scale in this sector. As regards groupings and the creation of

Table 7
Personnel (both public and private) per bed in the hospital sector, 1987

| | B | DK (*) | D | E (*) | F (*) | GR | IRL | I | P | UK | USA (*) | Japan |
|--------|------|--------|------|-------|-------|------|------|------|------|------|---------|-------|
| Total | 1.25 | 2.40 | 1.25 | 1.58 | 1.37 | 1.17 | 1.50 | 1.37 | 1.70 | 2.60 | 2.75 | 0.77 |
| Nurses | 0.68 | 0.60 | 0.45 | 0.37 | 0.38 | 0.49 | 1.20 | 0.60 | 0.47 | 0.69 | N/A | 0.39 |

(*) Figures for 1984

(*) Figures for 1983

(*) Figures for 1985

(*) Figures for 1986

Source: OECD Health Systems 1990



Table 8
Personnel employed in General Hospitals, 1987 (1)

| | Total | Public | Private |
|-----------------|--------------|---------------|----------------|
| Belgique/België | 93 902 | 41 319 | 52 583 |
| Danmark | 99 256 | N/A | N/A |
| BR Deutschland | 687 000 | N/A | N/A |
| España | 294 000 | N/A | N/A |
| France | 928 000 | 640 000 | 288 000 |
| Ireland | 54 671 | 50 671 | 4 000 |
| Italia | 723 500 | 659 500 | 64 000 |
| Nederland (2) | 167 201 | N/A | N/A |
| Portugal | 90 000 | N/A | N/A |
| United Kingdom | 1 018 705 | 988 205 | 30 500 |

(1) Paid and unpaid
(2) 1988
Source: CEHP

chains, American studies indicate a likely increase in costs, especially in administration.

CEHP: Comité Européen de l'Hospitalisation Privée. Address: 5 avenue A. Solvay, 1170 Brussels; Tel: 02/672.13.50; fax: 02/672.90.62

Waste is increasingly significant to the economy in industrialised countries, not so much on account of the development of quantities produced, as the reinforcement of regulations and the problems relating to the acceptability of processing sites by river banks which are leading to an increase in the technological level of activities, increasing the economic value of services, and encouraging all types of recovery.

Demand for services in this sector could be assessed at 11 billion ECU in 1989 for the collection and processing of waste and 14 billion ECU for the reprocessing of materials. This demand is basically satisfied by the private sector which has a market share of 68% in waste, and virtually 100% in recovery materials.

The main stakes in this sector concern the technical and economic feasibility of large-scale recycling and the vital changes in structure which would have to lead collectors, eliminators, regenerators and users of recycled materials to become integrated and specialise in order to exploit the EC's waste deposits as efficiently as possible.

Description of the sector

The waste sector covers a wide variety of activities which are all aimed at reducing, processing, storing or reintroducing into the production cycle, the waste produced by man and technology.

Activities which fall within this sector are

those involving:

- the collection and processing (including dumping) of waste which is not directly taken over at its source by the recyclable materials circuit (part of NACE 921);
- materials for reprocessing (NACE 62).

Table 1
Waste disposal and recycling
Main indicators

| | 1989 | 1990 | 1993 |
|---|---------|---------|---------|
| PRODUCTION (billion ECU) | | | |
| - Collection and processing of waste (*) | 11.0 | 11.8 | 14.8 |
| - Materials reprocessing | 14.0 | 14.0 | 16.0 |
| NUMBER OF FIRMS (Private sector) | | | |
| - Collection and processing of waste (*) | 5 500 | 5 200 | 4 500 |
| - Materials reprocessing | 4 500 | | |
| NUMBER OF EMPLOYEES (Private sector) | | | |
| - Collection and processing of waste (*) | 160 000 | 171 000 | 225 000 |
| - Materials reprocessing | 120 000 | 115 000 | 100 000 |
| NET EXPORTS (billion ECU) | | | |
| - Materials reprocessing | 2.2 | 2.2 | 2.5 |

(*) Running costs for private sector and local public services, not including investments in installations and materials.
Source: Sema Group Management Consultants

The collection and processing of

waste Urban and industrial waste are

divided into separate categories:

- urban waste, the management of which is considered to be the responsibility of towns and ad-hoc regional structures, include several categories which are quite similar:
- ❖ household waste which, after standard collection, is processed in dumping installations, incineration (with or without heat recovery), compost preparation or which are sent, after collection and selective sorting, to recovery channels;
- ❖ waste from craftsmen and small businesses which are managed by the same circuit and in the same way as household waste;
- ❖ other urban waste discarded by private in-

dividuals following special elimination and upgrading channels: bulky waste (furniture, domestic appliances), sewage material from septic tanks, waste from public green-belt areas).

- waste from service industries can be broken down into several very different categories which each have their own particular circuit and require distinct processing methods:
- ❖ industrial waste, of a similar composition to household waste and with the same purposes;
- ❖ waste from the building sector and other inert waste which is unloaded or re-used for embankment and excavation work;
- ❖ toxic and special waste, liquid or solid, which is collected and processed using specific systems (incineration, physico-

chemical processing, special dumping, re-generation);

❖ hospital waste, generally incinerated. Activities involving industrial waste are generally taken on by private specialist companies.

However, some industrial waste is also treated on the spot in the establishments concerned (internal rubbish dumps, business incinerator).

Reprocessing materials The activities of the reprocessing sector involve collection, demolition, sorting, the transformation and marketing of all materials likely to be reintroduced into the economic circuit in the form of "secondary raw materials": old iron, non-ferrous metals, paper and cardboard, textiles, plastics, organic materials.

Businesses whose operations mainly or exclusively involve the demolition of ships, the transformation of recycled material for the production of new products (used fabrics = textile industry; conversion of old papers and rags = paper industry; remoulding of tyres = rubber industry, etc.).

Globally, this waste reprocessing activity accounts for 25% of the EC supplies of non-energetic raw materials.

A considerable part of this activity is the

Table 2
Waste disposal and recycling
Estimate of private sector market shares in waste removal and processing (%)

| | D | E(*) | I(*) | NL | F(*) |
|-------------------------|----|------|------|----|------|
| Urban waste | 50 | 70 | 40 | 35 | 40 |
| Industrial waste | 70 | 80 | 90 | 85 | 95 |
| Toxic and special waste | 95 | 90 | 85 | 65 | 100 |

(*) Sema Group Management consultant estimates
Source: FEAD



Table 3
Waste disposal and recycling
The potential market for waste collection and processing, 1989
Waste production by category

| (million tonnes) | B | DK | D | GR | E | F | IRL | I | L | NL | P | UK | Total EC |
|--|-----|-----|------|-----|------|-----|-----|------|-----|-----|-----|------|----------|
| Urban waste | 3.1 | 2.2 | 19.3 | 2.5 | 10.6 | 15 | 1.1 | 14 | 0.2 | 6.5 | 1.9 | 16.7 | 93.1 |
| Industrial waste comparable to household waste | 7.1 | 2.3 | 56 | 3.9 | 21 | 47 | 1.6 | 39.9 | N/A | 5.2 | 6.4 | 45.5 | 235.3 |
| Special and toxic industrial waste | 0.9 | 0.1 | 6 | 0.4 | 1.8 | 3 | 0 | 3.8 | N/A | 1.5 | 0.2 | 4.5 | 22.2 |
| BTP sector waste | N/A | N/A | N/A | N/A | 22 | 100 | N/A | 24.4 | N/A | 7 | N/A | N/A | N/A |

Source: OECD, FEAD

subject of a particular chapter on "the trade in old iron and non-ferrous metals for reprocessing (NACE 621). In this chapter therefore, we shall only deal with general data from the sector or data which is specific to materials other than metals.

Current situation

The market volume for the collection and processing of waste was estimated to be approximately 11 billion ECU in 1990. This amount corresponds with the exploitation expenditure of local authorities and businesses for the management of their waste, i.e. to services provided by private companies in the sector and local authorities which have their own waste collection and processing system.

It does not include investment (purchases of material and equipment), or expenses relating to the additional activities of sewage purification, disinfection and detoxification of contaminated sites. The removal of construction and civil engineering waste is often dealt with by businesses within the sector, and this is not considered either.

The market share for waste collection and processing which is actually dealt with by the private sector can be estimated as 68%, i.e. a turnover of approximately 7.5 billion ECU within the EC for the activities considered.

It is higher, around 85% in the case of industrial, toxic and special waste, but is only 55% for household waste, where the activity of internal departments in local authorities is still significant, particularly for the aforementioned collection.

The reprocessing market within the EC was considered to be approximately 14 billion ECU in 1990. This amount corresponds to the market value of all the finished products prepared by the sector and sold on national and international markets.

This market is completely controlled by the private sector. This assessment does not include certain specialist channels such as the regeneration of used oils, which is very closely related to the oil sector.

The value of production within the sector mainly depends on the level of international prices for pure raw materials which affects both the unit price of reprocessing materials and the quantities recycled; actually, when prices are high, it becomes profitable for reprocessors to mobilise waste which is further away, more scattered or of a poorer quality.

Prices of reprocessing materials are affected by both the supply and demand situation, and, in Europe, by the value of the dollar which is used to fix prices.

The entire EC waste and reprocessing materials sector accounts for 10 000 businesses and employs approximately 300 000 people, 60% of which for waste collection and processing, and 40% for reprocessing.

Structure of the market

The sector's "waste and reprocessing" services market can be divided up by distinguishing the type of waste or materials, the service provider, and the type of activity carried out.

Sources of waste The potential market both for waste collection and reprocessing activities within the EC is approximately 100 million tonnes per year in terms of urban waste, between 200 and 250 million tonnes per year for industrial waste of the type which is comparable to household waste, and 22 million tonnes per year for toxic and special industrial waste requiring specific processing methods.

Full and regular inventories only exist for a few EC countries (Federal Republic of Germany, Netherlands) and there are still few viable methods enabling us to follow the historical development of the flow, except in the case of household waste.

As far as urban waste is concerned, the development of waste production is extremely variable according to the level of

Table 4
Waste disposal and recycling
The waste reprocessing market in 1989 by type of reprocessing materials

| (million tonnes) | B | DK | D | GR | E | F | IRL | I | L | NL | P | UK | Total EC |
|-------------------------|--------|------|------|------|------|------|------|------|-----|------|------|------|----------|
| Iron (1) | 1.6(4) | 0.4 | 13.5 | N/A | 3.8 | 9.7 | N/A | 7.7 | N/A | 2.1 | N/A | 9.7 | 48.5 |
| Paper and cardboard (2) | 0.60 | 0.30 | 4.70 | N/A | 1.50 | 2.70 | N/A | 1.40 | N/A | 1.40 | 0.30 | 2.60 | 15.50 |
| Glass (3) | 0.21 | 0.06 | 1.54 | 0.01 | 0.29 | 0.76 | 0.01 | 0.67 | N/A | 0.28 | 0.03 | 0.31 | 4.16 |
| Plastics (4) | 0.03 | 0.02 | 0.25 | N/A | 0.06 | 0.11 | N/A | 0.20 | N/A | 0.05 | N/A | 0.08 | 0.80 |

(1) Quantities collected
(2) Recyclable quantities - Source: La Récupération 6/90
(3) Quantities collected by final users (post users wastes), not including waste produced by the manufacturing industry and the transformation of plastic materials
(4) Belgium/Luxembourg
Source: FEVE, La Récupération 6/90, Sema Group

development in the various countries and the preventative policies which have been implemented.

In the Federal Republic of Germany and the United Kingdom, the annual production of urban waste varied between 330 kg and 350 kg per capita, without any significant change since 1975, whilst in the United States, this ratio increased from

650 kg to 865 kg per capita between 1975 and the present day, and, in the southern EC countries, during the same period, the figure shifted from 230 kg per capita to over 300 kg per capita.

Reprocessed materials account for approximately 75 million tonnes per year, if we examine only the major categories (old iron, non-ferrous metals, paper and card-

board, glass, plastics), i.e. 21% of the cumulative volume of urban and industrial waste.

The proportion of materials reprocessed in domestic waste is currently still very low, consisting basically of the selective collection of glass which accounts for 4% of the overall tonnage of household waste. The other forms of material reprocessing (except for compost preparation) are the result of selective collection programmes which are currently being launched, reaching, for example, in the most advanced country, the Federal Republic of Germany, 2 million tonnes, or 10% of household waste (including glass).

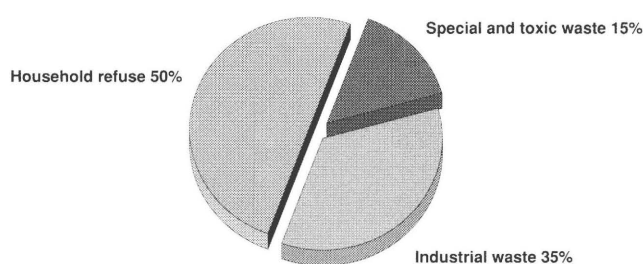
Reprocessed materials are basically derived from the flow of materials from businesses which supply approximately 70 million tonnes, i.e. a reprocessing rate of 27% in relation to all industrial waste within the EC. This ratio is much higher in certain countries and, for example, stands at 43% in the Federal Republic of Germany.

Certain types of liquid toxic waste are also the subject of small-scale reprocessing, such as solvents (0.3 million tonnes per year), or, much more systematically, soluble engine and industrial oils (1 million tonnes per year).

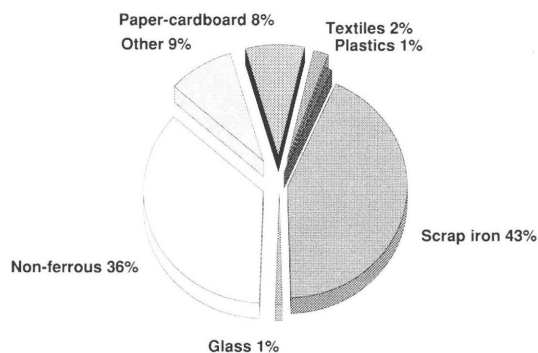
These quantities and ratios do not take

Figure 1
Structure of the service market in the waste disposal and recycling sector

Collection and recycling, 1989
(Total: 11 billion ECU)



Materials for recycling, 1989
(Total: 14 billion ECU)



Source: Sema Group Management Consultants

into account the recycling of waste carried out within businesses, which do not involve external service firms.

The reprocessing market has not developed a great deal over the last few years and the best development prospects are to be found within the sorting of recyclable materials contained in household waste and comparable industrial waste.

We can consider that household waste represents 50% of the total volume of activity with unit costs varying by country between 30 and 60 ECU per tonne for collection and 5 and 30 ECU per tonne for processing. The market for everyday industrial waste represents approximately 35% of the overall potential market for waste collection and processing, whilst the figure for special and toxic waste is 15%. The cost of a dump for pollutant waste may vary from 20 ECU per tonne for certain types of waste in France, to 300 ECU per tonne for waste which is the subject of special processing in the Federal Republic of Germany and Italy. The costs of incineration range from 40 ECU per tonne, for example, for a non-halogenated solvent and 170 000 ECU per tonne for highly toxic waste destroyed at high temperature, such as PCBs. The reprocessing materials market which is estimated to be worth 14 billion ECU can be broken down by order of importance between ferrous metals (42%), non-ferrous metals (35%), fibres for paper-making (8%), textiles (2%), glass (1%), plastics (1%) and various materials which are basically organic in origin: skins, waste from the agricultural and food industries, animal waste (9%).

Service providers The collection and processing of household waste are dealt with either by the internal departments of local

authorities, or by private businesses.

Waste management may be carried out according to various systems:

- direct control: the local authority takes responsibility for the removal and processing of household waste with its own staff, since it is the owner of the material;
- mixed control: the local authority keeps control of the service used and enters into an agreement with a contractor, paying him in accordance with his service (hiring staff, skips,...);
- leasing: the local authority entrusts the collection and/or the processing of household waste, but the majority of investment, vehicles and/or installations are financed by the local authority;
- concession: the difference in comparison with leasing is due to the fact that most investment is carried out by the firm, which is paid directly by service users paying a fee.

In the Netherlands and Great Britain in particular, a significant proportion of activities are carried out by local public services.

The industrial waste networks are more diversified in that waste can be taken on by a private firm, but also by a firm which will process its waste using its own installations, or installations belonging to another group, or by public departments or mixed capital companies such as the type which exists for standard waste (VAM in the Netherlands), WDA (waste disposal auth-

Table 5
Waste disposal and recycling
Unit costs of collection and processing of household waste

| (ECU/tonne) | D | E | F | I | UK |
|--------------------|-------|----|-------|-------|-------|
| Collection | N/A | 30 | 50 | 20-30 | N/A |
| Compost production | 25-35 | 20 | 13 | N/A | N/A |
| Incineration | 40-80 | 35 | 10-40 | N/A | 15-30 |
| Dumping | 15-40 | 10 | 5-20 | 25-50 | 8-15 |

Source: FEAD

orities) in Great Britain or for toxic and special waste (Kommunekemi in Denmark, AVR-Chemic in the Netherlands, RWA treatment plants in Great Britain, several centres in the Federal Republic of Germany).

A certain amount of industrial waste is, as we have seen, directly collected by reprocessors. In comparison with an overall potential market of 11 billion ECU (excluding internal activities within businesses), the private sector share in waste collection and processing is approximately 3 billion ECU for household waste, 3 billion ECU for everyday or inert industrial waste and 1.5 billion ECU for toxic and special industrial waste.

Types of activities Activities carried out by service providers basically differ in terms of waste processing.

As far as urban waste is concerned, the distribution of processing methods carried out in the EC highlights the still highly significant share of dumps, standing at some 60% of collected tonnage. Incineration as a form of energy reprocessing is on the decline (except for specific restrictions existing in certain zones such as mountainous regions), which accounts for only 8%.

All processing methods facilitating the upgrading of waste account for 24%, 13% of which being incineration with energy reprocessing, 6% compost preparation and 5% sorting leading to the reprocessing of cer-

Table 6
Waste disposal and recycling
Share of management methods by country and type of waste

| (%) | B | DK | D | GR | E | F | IRL | I | L | NL | P | UK | Total EC-12 | USA | JPN |
|---|------|------|------|------|-------------------|------|------|------|------|------|------|-------------------|-------------|---------------------|------|
| URBAN WASTE | | | | | | | | | | | | | | | |
| Processing for disposal and storage | | | | | | | | | | | | | | | |
| Dumping | 46.5 | 61.3 | 62.9 | 98.4 | 73.6 | 44.9 | 98.0 | 36.1 | 22.0 | 53.0 | 23.4 | 86.4 | 59.7 | 0.8 | 25.0 |
| Incineration without energy reprocessing | 15.3 | N/A | 0.5 | 0.0 | 2.3 | 12.5 | 0.0 | 15.0 | 0.0 | 10.0 | 0.0 | 11 ⁽¹⁾ | 7.9 | 0.0 | |
| Upgrading processing | | | | | | | | | | | | | | | |
| Incineration with energy reprocessing | 6.5 | 31.5 | 25.2 | 0.0 | 2.7 | 21.7 | 0.0 | 4.1 | 78.0 | 24.5 | 0.0 | N/A | 13.0 | 0.10 ⁽¹⁾ | 72.0 |
| Compost preparation | 10.6 | 4.5 | 1.9 | 0.0 | 18.8 | 7.6 | 0.0 | 5.7 | 0.0 | 4.4 | 16.4 | 0.0 | 5.8 | 0.0 | |
| Mechanical sorting and selective collection | 6.3 | 2.6 | 8.9 | 0.6 | 2.6 | 4.8 | 1.0 | 7.3 | N/A | 4.7 | 2.0 | 2.8 | 5.4 | 0.10 ⁽²⁾ | |
| Various | 14.7 | 0.0 | 0.5 | 0.0 | 0.0 | 8.5 | 0.0 | 31.8 | 0.0 | 3.4 | 58.2 | 0.0 | 8.2 | 0.0 | 3.0 |
| Upgrading rates for urban waste | 23.5 | 38.7 | 36.0 | 0.6 | 24.2 | 34.1 | 1.0 | 17.1 | 78.0 | 33.7 | 18.4 | 2.8 | 24.2 | 20.0 | 72.0 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| SPECIAL AND DANGEROUS WASTE | | | | | | | | | | | | | | | |
| Off-site processing | | | | | | | | | | | | | | | |
| Incineration | N/A | 45 | 14 | N/A | 15 ⁽³⁾ | 25 | N/A | 3 | N/A | 29 | N/A | 1 | N/A | 6-9 | N/A |
| Physico-chemical processing | N/A | 25 | 4 | N/A | 30 ⁽³⁾ | 20 | N/A | 0 | N/A | 9 | N/A | 10 | N/A | 20-33 | N/A |
| Dumping | N/A | 15 | 39 | N/A | 55 ⁽³⁾ | 27 | N/A | 10 | N/A | 6 | N/A | 72 | N/A | 35-60 | N/A |
| Underground injection | N/A | 0 | N/A | N/A | 0 | 1 | N/A | 0 | N/A | 0 | N/A | 2 | N/A | 5-10 | N/A |
| Others ⁽⁴⁾ | N/A | 12 | 20 | N/A | 0 | 20 | N/A | 75 | N/A | 41 | N/A | 7 | N/A | 7 | N/A |
| On-site processing | N/A | 3 | 23 | N/A | 5 ⁽³⁾ | 8 | N/A | 12 | N/A | 15 | N/A | 8 | N/A | 10 | N/A |

⁽¹⁾ Incineration total

⁽²⁾ including compost preparation

⁽³⁾ Spain's objectives for 1993

⁽⁴⁾ solidification, disposal at sea, export, recycling, cement plant processing

Source: OCDE, FEAD, Sema Group

tain materials (mainly glass, paper and cardboard, metals, plastics). Various processing methods, some of which include some form of upgrading (e.g. RDF, refuse derived fuel) account for the remaining 8% of the market. Dumping is practised in Great Britain and Spain in particular (over 70% of collected tonnage). Incineration with energy reprocessing is well established in Luxembourg, the Netherlands, Denmark, the Federal Republic of Germany and France (over 20% of tonnage). Compost preparation is a speciality in the Netherlands (16%) and Spain (19%). Sorting of materials reprocessing is

well advanced only in the Federal Republic of Germany (9%) thanks to a great many selective collection programmes using a special bin for recyclable materials ("grüne tonne" or green rubbish bins) or even local multi-material or single material containers like the ones now used for glass in all EC countries. 70% of industrial waste comparable to household waste is mainly dumped, and is therefore responsible, in the same way as household waste for rapidly exhausting ground space available for burying waste. However, certain countries have developed specific policies either for reprocessing (Germany, 43%), or incineration with en-

ergy reprocessing (Netherlands, 70%). In the case of toxic waste, the main processing methods performed outside business by specialist companies are dumping in specially protected sites (35% of waste produced), incineration with advanced processing of flue gases (20%), physico-chemical processing (25%), regeneration (5%), various processing methods including processing in the North Sea on incinerator ships, whose activities have to cease in 1992, processing in the ovens of cement plants or boilers in fuelled power stations (5%). The remaining 10% being processed in businesses own on-site installations, mainly by incineration.

However, the quantities processed by manufacturers are scarcely known within the EC. We have seen that in Germany, the quantities which thus escape the external processing market represent some 23% of the total industrial waste.

External waste trade

The logic of the 1992 market could be increased waste production and an increase in the movement of waste.

Presently, the waste trade is characterised by several types of flow:

- still limited cross-border flow of urban and industrial waste comparable to household waste attempting to benefit from greater dumping capacities and more attractive prices in another region. The radius of these movements does not seem to have exceeded 200 km for the time being due to the relationship between transport costs and the difference in dumping costs;
- more significant trade in toxic industrial waste which can be explained by the absence of appropriate processing facilities in certain countries (Ireland and Luxembourg, which export 100% of dangerous waste produced in their territory), but more often due to a deliberate export policy for dangerous waste. Exports are stimulated by NYMBY syndrome ("not in my back yard") which slows down the development of adequate processing facilities in the waste production zones which are also the regions which are most exposed to pressure from ecologists;
- the flow of non-pollutant reprocessing materials, the logic of which primarily complies with that of an international market (non-ferrous metals, old papers) as in the case of pure, raw materials.

Exports of dangerous waste from the EC are virtually unheard of, but they are esti-

Table 7
Waste disposal and recycling
Exports of dangerous waste recorded, 1988-89
Quantities of dangerous waste exported

| Country | Tonnes | % of total |
|----------------|-----------|------------|
| Danmark | 9 000 | 8.0 |
| France | 43 000 | 1.4 |
| BR Deutschland | 1 058 000 | 18.0 |
| Ireland | 14 000 | 70.0 |
| Luxembourg | 4 000 | 100.0 |
| Nederland | 189 000 | 13.0 |
| USA | 127 000 | N/A |
| Switzerland | 108 000 | 27.0 |

Source: OECD

mated to stand at 2 million tonnes, i.e. approximately 90% of the volume produced, the bulk of which comes from Germany. The EC strategy for waste management, consolidated by the Basle convention of 1989 on the international movement of waste, introduced the concept according to which waste had to be eliminated "in the nearest adequate centres using the most appropriate technology guaranteeing a high level of protection for the environment and public health."

As far as waste for recycling purposes is concerned, the strategy is different in order to encourage the recycling of this waste: It is considered that free competition must prevail, obviously not to the detriment of the environment or human health, which justifies a certain degree of control

of waste movement which could result in pollution, which is not the case with the majority of reprocessing materials, the specifications of which are well established on an international level.

External deliveries for reprocessing materials is vital since it represents 6 billion ECU for export and 4 billion for import, which leaves a net export balance of 2 billion ECU.

Employment and investment

Approximately 290 000 people work for businesses in the sector, 120 000 of which are involved in reprocessing activities.

The reprocessing sector still accounts for many craftsman and individual firms which represent 25% of the overall employment

Table 8
Waste disposal and recycling
Employment in the materials reprocessing sector (1)

| | Non salaried | | Salaried | | Total | |
|---------------------|---------------|---------------|---------------|---------------|----------------|----------------|
| | 1987 | 1988 | 1987 | 1988 | 1987 | 1988 |
| Belgique/België | 1 881 | 943 | 1 319 | 1 688 | 3 200 | 2 631 |
| Danmark | 202 | 192 | 1 404 | 2 525 | 1 606 | 2 717 |
| BR Deutschland | 4 500 | 3 250 | 8 000 | 6 500 | 12 500 | 9 750 |
| Hellas | 1 225 | 1 293 | 340 | 136 | 1 565 | 1 429 |
| España | 9 061 | 8 583 | 5 432 | 7 247 | 14 493 | 15 830 |
| France | 6 452 | 7 150 | 23 416 | 18 672 | 29 870 | 25 822 |
| Ireland | 180 | 157 | 99 | 41 | 279 | 198 |
| Luxembourg | N/A | 14 | 106 | 45 | 106 | 59 |
| Nederland | 1 316 | 1 379 | 2 825 | 2 478 | 4 141 | 3 857 |
| United Kingdom | 5 642 | 5 712 | 26 962 | 25 569 | 32 624 | 31 261 |
| Total EC (2) | 37 000 | 36 000 | 88 000 | 84 000 | 125 000 | 120 000 |

(1) Italy and Portugal: not available

(2) estimated

Source: Sema Group Management Consultants

Table 9
Waste disposal and recycling
Some companies in the EC waste sector
(collection and processing)

| Country | Company |
|-----------------|--|
| Belgique/België | Biffa Lamesch Soneville |
| BR Deutschland | Edelhoff Rethmann Schweitzer Trienekens |
| España | Cycsa Fosca Inusa |
| France | Onyx-Cgea (CGE group) STA (SLEE group) Tredi |
| Italia | ICM Saspi Slia |
| Nederland | Icova Spitman Van Gansewinkel Van Vliet |
| United Kingdom | Attwoods Biffa (BET group) Cleanaway Laidlaw (UK) Shanks and Mc Ewan |

The major world groups in the field of waste processing

| | Turnover (billion ECU) |
|-----------------------------|---------------------------|
| Waste Management (USA) | 3.8 |
| Browning Ferris (USA) | 2.2 |
| Générale des Eaux (France) | 0.7 |
| Laidlaw (Canada) | 0.5 |
| Lyonnaise des Eaux (France) | 0.5 |

Source: Sema Group Management Consultants

figure. Relatively low production levels are gradually improving as the sector becomes more integrated and we expect to see the workforce decrease at a rate of 5% per annum, in spite of the foreseeable rise in quantities processed.

Investments, which up to now accounted for 10% of turnover, are experiencing rapid growth in order to both meet the need for new capacities and more efficient processing technologies which will not generate secondary pollution and are fitted with safety devices.

The added value of the sector is over 75% and the net margins are between 10 and 15%.

Prospects

In the medium term, services connected to waste management are likely to be affected both by the development of regulations, changes in flow and the strategy of the various operators.

Future European regulation of the waste sector will be closely related to the objectives defined in 1989 by the Commission of the European Communities as guidelines for waste policy:

- ❖ prevention of waste production;
- ❖ upgrading and recycling;
- ❖ optimisation of final disposal;
- ❖ transport control;
- ❖ curative operations in order to repair damage caused to the environment.

This policy should lead to changes in flow, distinguished by a reduction in waste produced and processed in disposal centres and an increase in quantities reprocessed.

The reduction in quantities to be processed will lead to both the development of clean technologies and eco-products and greater involvement on the part of the public and businesses in programmes aimed at sorting waste at source. Viewed from another angle, the consolidation of controls applied to the operation of processing units and the problems connected to the difficulty in finding available ground for new sites will lead to an increase in processing costs and will benefit techniques which, like incineration, guarantee a reduction in the volume of waste.

Reprocessing programmes, closely surrounded by regulatory objectives and adapted funding, run the risk of putting on the secondary materials market quantities

of increasingly important products which could lead to a lasting drop in international trade if new user markets are not to develop at the same time. The success of waste upgrading policies will also depend on the emergence of technologies such as automatic sorting and thermo-chemical or thermo-biological processes which have not succeeded in making an impact up to now, not having resolved the problems related to both the preparation of incoming materials and the outgoing products market. In all instances, additional costs will emerge which will benefit in particular from collection and sorting activities.

Financing the extra cost of recycling programmes will also be the subject of numerous negotiations between economic operators (local authorities, manufacturers, production of the initial product, waste-producing manufacturers).

The structure of the sector should continue to develop to a considerable extent, not only in terms of the concentration, internationalisation and industrialisation of the profession, but also due to a redistribution of activities between operators. Companies currently controlling waste deposits by means of their collection activities will be able to use this guaranteed income and increase their market share by recovering activities currently operated by public services and also by diversifying their activities. These diversifications will be oriented towards recycling (takeover or partnership with companies in the reprocessing sector) and towards the concession of public services by providing all investment in processing installations. For their part, reprocessing professionals, anxious to distinguish themselves from the waste sector, will seek to specialise in

Table 10
Waste disposal and recycling
Closed list of EC projects in the field of waste

- Proposal to the Council for the continuation and consolidation of Community activities for the environment (ACE) in the field of clean technologies.
- Proposal regarding the ecological parameters of products, aiming at the implementation of a Community system granting ecological labels.
- Proposal to the Council for the continuation and consolidation of Community activities for the environment (ACE) in the field of upgrading techniques.
- Proposal regarding packaging.
- Proposal regarding plastic waste.
- Proposal regarding metallic packaging.
- Studies on instruments facilitating more effective upgrading of waste (recyclable materials grants, computing systems, data banks)
- Long-term programme for twenty priority types of waste.
- Proposal aiming to draw up a list of types of waste for which dumping is forbidden or subject to certain conditions.
- Proposal regarding incinerators of industrial waste (ACE) in the field of contaminated soil rehabilitation (pilot schemes)
- Study of the existing and anticipated financial instruments aimed at repairing damage caused by waste in abandoned dumping sites.

Source: Sema Group Management Consultants

Table 11
Waste disposal and recycling
The processes of the future

| Techniques | Type of waste | Companies | References |
|----------------|---|---|---|
| Electron torch | Liquids with organochlorides (incl. PCB) | Westinghouse (USA)/ Pyrolysis System (Canada) | USA (Love Canal) |
| | Solid or pasty chemicals | Rhône Poulenc (F)/EdF (FV)/ Spe Batignolles (F) | France: (Rhône-Poulenc) Capa: 1300 t of solid residue (chemicals, pitches, tar) Investments: 20 million FF Expected investment return: 3 years |
| Bacteria | Soils contaminated by PCBs | National Institute of Scientific Research (Canada) General Electric (USA) Bayer (D) Hitachi (Japan) | Experimental Experimental |
| | Solvents, fuel petrochemical muds | ENSR/CEL GENE (USA) | |
| Fluidised beds | Muds with organochlorides | GIA Technologies (USA) Stein/Montenay (F) Université de Savoie/ Girod Sisa (F) | |
| | Soils contaminated by PCBs | Lurgi (D) Smit Owens (PB) Comprino (PB) | |
| Pyrolyse | Organic muds PCB Contaminated soils | Westinghouse (USA) Keramikindustrie Anlagen W. Strommenger (D) Comprino (PB) | Commercial stage |
| Lasers | | Akzo (PB)/R.P (F) (Eureka project) | |

Source: Sema Group Management Consultants

"raw materials" and will focus upon activities downstream from their network such as the preparation, formulation and international negotiation for materials, the added value of which will be increased by more specialised transformations.

An important condition for this development is that a clear definition should be formulated of the concepts of "waste" and

"recyclable waste", pollutants or non-pollutants and secondary raw materials.

**Written by: Sema Group Management
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The water distribution sector within the EC encompasses every stage in the management of water, from production, to supply, to the consumer. The level of facilities in this sector is already very high and the proportion of people connected to drinking water supplies is almost 100% in all the countries of the EC. Most investments will, under the impetus of new regulations, concern demand for modernisation and innovation, aimed at updating existing services. The economic and financial development of the distribution companies is prompting them to adopt new strategies for vertical integration and internationalisation. Even though numerous national differences remain, particularly as regards the way in which networks are run and prices charged.

Description of the sector

Water distribution is a generic term which covers several stages in the process of water management, whose final objective is the supply of water to the consumer. Before it can be properly distributed therefore, the water has to be produced, i.e. collected (surface water) or pumped (subterranean water), then treated in treatment plants, collected and stored in tanks and finally conveyed by gravity via networks of pipes until it reaches its final destination. The prices charged for water distributed to the consumer thus cover the entire management (public or private) system at three levels, i.e. the construction of the infrastructures and networks and their oper-

ation and maintenance.

As regards water consumption, the main sector is industry (in particular cooling water for thermal power stations), followed by agriculture and households.

A large proportion of consumption, therefore, falls outside the drinking water supply network (transfer into rivers and groundwater tables).

Finally, water is also collected for leisure activities, such as water sports.

Within the EC there are five approved types of management structure.

60% of the networks are run by state bodies and the rest by private bodies (type n° 5). The percentages differ greatly from one country to another.

Table 1
Water distribution
Network management structures

| Types of structure | Definition |
|--------------------------------|--|
| District authority | Department incorporated in the local authority |
| Independent district authority | Department of the local authority with legal status |
| Intercommunal body | Body encompassing several local authorities on the basis of an agreement |
| National Company | Corporated body |
| Private Company | Private body which has been granted sole rights to manage the public service under agreement |

Source: BIPE

Investment

As previously mentioned, in Europe the percentage of people connected to drinking water supplies is very high, thanks to sustained investment in the 1970s. In Spain, for example, the proportion of people connected rose from 66% in 1968 to 96% in 1981. Further investments aimed at extending networks are therefore unlikely. This is, however, different for the Federal Republic of Germany, where 2/3 of total investment is destined for the expansion of water supply networks.

In addition, ageing networks, European regulations on the quality of water, prob-

lems with drought (particularly in Southern Europe) and ever greater emphasis on improved productivity in terms of management, will eventually lead to large-scale investment aimed at modernising networks (renovation and automation) and increasing their capacity (increase in the intermediary storage volumes and treatment units) in most EC Member States.

Future investment programmes in the sphere of water distribution will thus focus on the safety, quality and productivity of the water supplied; the 1980s and, even more so, the 1990s seem to mark a transition from a demand for design, construc-

tion and infrastructure facilities to a demand for modernisation and innovation, aimed at updating existing facilities.

In France, for example, according to the National Building Federation, an equipment investment programme providing an extra 65 billion FF would greatly help to improve the structures already in place and to absorb part of those needs which have not yet been satisfied (3% of the population is not yet connected to the mains):

- FF 15 billion investment aimed at completing and improving the supply and distribution network;
- FF 5 billion is planned for quality-related works and 45 billion for safety-related work (doubling certain supplies, interconnections, fire protection, storage, protecting water points and collection sites). In the Federal Republic of Germany, however, investments in modernisation had already been foreseen and therefore carried on for many years. On the other hand, it is very difficult to get a clear view of the current situation in terms of inward investment in Germany since the reunification, as information is not readily

Table 2
Water distribution
Population and number of people connected, 1988

| Country | Total population (million inhabitants) | Popul. connected (million inhabitants) | Percentage connected | Volume distributed (million m ³) |
|-----------------|---|---|-------------------------|---|
| Belgique/België | 9.9 | 9.7 | 98 | 662 |
| Danmark | 5.1 | 4.4 | 86 | 630 |
| BR Deutschland | 61.1 | 59.9 | 98 | 4 459 |
| Hellas | N/A | N/A | N/A | N/A |
| España | 38.8 | 37.2 | 96 | 2 940 |
| France | 55.5 | 55 | 99 | 4 700 |
| Ireland | 3.44 | 3.23 | 94 | 400 |
| Italia | 57 | 55 | 96 | 5 000 |
| Luxembourg | 0.37 | 0.37 | 100 | 34 |
| Nederland | 14.5 | 14.5 | 99,9 | 1 100 |
| Portugal | N/A | N/A | N/A | N/A |
| United Kingdom | 56.7 | 56.7 | 100 | 5 310 |
| Total CE | 302.41 | 296 | 98 | 25 235 |

Source: Public contracts in the water sector.
Administrative and legal structure of production and distribution bodies, SOBEMAP - July 1988.

available for the former GDR.

In the United Kingdom, even after privatisation, the Water Authorities will be required to invest several billion pounds each year.

In Italy, the increasingly frequent use of river water for drinking water supplies, as a result of the surface water being almost totally exploited, has created a need for large-scale investment.

According to a study carried out by EUROSTAF in August 1990 on water distribution in Europe special emphasis on investment over the past five years has been accompanied by a strategy to reduce long-term debt. Beyond acquiring a self-financing capacity which is not nearly sufficient to cover this outlay, and with a few notable exceptions, the extra funds take the form of short-term commitments, and cash funds are being rapidly depleted. But this is not the case in the Federal Republic of Germany, where the water supply networks are in good conditions and where the financing is granted by water prices rather than by debts. This strategy of debt reduction is therefore not applicable to Germany.

In order to overcome this growing gap between needs on the one hand, and investment capacity and the financial difficulties besetting network operators on the other, we should see a general move (whether the networks be private or state-run) towards an increase in the price per m³ of water distributed in order to bring about the much-needed modernisation of water distribution in the EC. Germany is again an exception here, since the water price is fixed by companies controlled by the council. The water price is fixed in relation to costs. Price rises have already taken place in Germany, therefore the general

price rise tendency in the EC does not apply.

Geographical characteristics

Quite apart from the sector's structural growth trends, which will eventually affect every EC country, there are numerous regional and national disparities. The main disparities concern the way in which the networks are run, the price of the water and the number of bodies which exist as well as the number of employees.

Methods of running the networks

France traditionally has a high percentage of privately-run networks (70%), thus explaining the prominent role played by large private water distribution companies. Since privatisation, 88% of the British network is privately-run. Alongside these two extreme examples, where privately-run networks are by far the most common type (albeit for very different reasons) no EC country has entrusted the bulk of its networks to private suppliers (except for Greece).

In the Federal Republic of Germany notwithstanding the company statute, more than 96% of the exploitations come under the jurisdiction of the councils.

In the Netherlands, the private status of certain firms is highly ambiguous and the "private" operators often turn out to be industrial and commercial companies in which the state has a majority holding. In Italy, too, the vast majority of networks are owned by the state. Only Spain appears to be moving towards a system of mainly private management.

Generally speaking, given the current trend towards privatisation, it appears that apart from France (where privatisation is continuing) and the United Kingdom, moves towards the privatisation of water

distribution are occurring in Spain, Italy, Belgium, Portugal and also probably also Eastern Europe.

Conversely, according to a company model, the Federal Republic of Germany, the Netherlands and Scandinavia seem to be firmly committed to the notion of state-run networks.

The price of water The Netherlands have traditionally charged high prices for water (compared with those charged in the rest of the EC) and have thus been able to fund various voluntaristic policies where water is concerned.

In the Federal Republic of Germany, this phenomena of high prices can be explained by the fact that water price is fixed in relation to the costs. This allows the German communes to invest in the installation of an adequate and reliable water supply network.

Conversely, Italy and Spain have always set extremely low prices, which bear no relation to the amount of money needed to finance investment, reflecting a general lack of interest in environmental issues which lasted for many years.

The Scandinavian countries also charge fairly low prices. This is due to the role assigned to public services (services provided to everyone, at a low cost) but also the relative ease with which water resources can be exploited (abundant supply of water points, the high quality of untreated water, topography of the landscape). It is interesting to note, however, that Denmark had the lowest proportion of people connected to the mains in the EC. Finally, France and the United Kingdom (before privatisation) are currently in a transitional stage.

In assessing the number of bodies and

Table 3
Water distribution
Average price of water in July 1988

| Country | ECU |
|-----------------|-------|
| Belgique/België | 0.80 |
| Danmark | 0.34 |
| BR Deutschland | 0.92 |
| Hellas | N/A |
| España | 0.26 |
| France | 0.669 |
| Irland | N/A |
| Italia | 0.207 |
| Luxembourg | 0.526 |
| Nederland | 0.726 |
| Portugal | N/A |
| United Kingdom | 0.464 |

Source: International association of water distributors, May 1990.

the number of people employed it is difficult to pinpoint the vast range of bodies which exist; often very small, either state-run or private, some provide more information than others concerning their activities. Very often, only bodies which are members of national water distribution associations are taken into account in the statistics. As regards the turnover for the sector, it is quite impossible, as we mentioned earlier, to obtain figures from the huge number of bodies, which differ widely both in terms of their status (state-run or private) and activities (water distribution and often purification-sanitation, sometimes hydraulic works,

Table 4
Water distribution
Bodies and number of people employed

| | Nombre of bodies | Nombre of people employed |
|-----------------|------------------|---------------------------|
| Belgique/België | 166 | 7 350 |
| Danmark | 3 900 | 1 608 |
| BR Deutschland | 6 400 | 34 400 |
| Hellas | N/A | N/A |
| España | 8 023 | N/A |
| France | 16 560 | N/A |
| Irland | N/A | N/A |
| Italia | 5 092 | N/A |
| Luxembourg | 128 | N/A |
| Nederland | 86 | 8 406 |
| Portugal | N/A | N/A |
| United Kingdom | 52 | 63 207 |
| Total | 40 407 | |

Source: SOBEMAP, EC, Final report

engineering, electricity and gas distribution).

By multiplying the number of m³ distributed by the sale price, however, one can arrive at a fairly representative estimate of the turnover for the water distribution sector (public sector and private sector combined).

Structural development

The main developments which affect the water distribution sector in Europe are of a statutory nature and relate to stricter quality standards and changes in the legal status of the bodies concerned.

Directives on the quality of drinking water

The basic principles of water prospecting, its conversion and management have been established in a fairly detailed manner: various types of initiatives have been introduced with the declared aim of improving the way in which the available resources are exploited, protecting high-quality water and improving the presentation of research findings in order to facilitate comparison. Some 25 or so legal acts concerning water have already been adopted and a further half-a-dozen are awaiting a decision.

Two European directives, one of which was adopted in June 1975 and the other in June 1980, lay down criteria for surface water intended for the production of feed water and water intended for human consumption.

The testing methods and the frequency of the tests regarding surface water were themselves harmonised by another directive, adopted in October 1979, which specifies measuring methods relating to the physical, chemical and microbiological characteristics of water.

Following the introduction of a chapter spe-

cially devoted to the environment within the framework of the Single Europe Act and the fourth programme for the environment (1987-1992), standards governing drinking water have been tightened at the EC level (Directive drinking water 80/778).

Changes in the legal status of operators Economic and financial changes are linked to the privatisation of water distribution.

At present in some EC countries, the whole notion of state-run water distribution systems is being called into question, either for reasons to do with economic thinking and a clear desire for less State control (United Kingdom) or for more pragmatic reasons linked to the gap that exists between growing needs regarding the environment and the fact that local authorities are unable to provide more funding and in some cases have to settle for less (Spain, Italy).

The privatisation of water distribution in the United Kingdom is based on the hypothesis that a privately-run water distribution system is more efficient because it is more profitable. A state supervisory body, however, which imposes certain standards relating to quality and investments has been set up to closely monitor the new system.

By contrast, in Italy and Spain, the prime factor in privatisation is the lack of financial resources on the part of local authorities. The handing over of networks to private firms presupposes that, unlike the public authorities, private firms will have the necessary funds to operate, invest in, maintain and renovate the networks. In the Federal Republic of Germany, however, this isn't justified: the privatisation of

water distribution is not, neither foreseen to be, nor necessary.

Situation and development of water distribution companies

As a result of all the developments referred to above, the situation of water distribution companies is changing radically. Within these companies, three trends would seem to be emerging:

- ❖ Conventional state-owned or mainly state-owned distribution companies which remain cut-off in terms of their activity and network. Very often, through the local authorities, these companies own their network and are largely unaffected by recent shifts in public opinion in favour of privatization: such companies are found mainly in the Federal Republic of Germany, the Netherlands and Belgium;

- ❖ Companies seeking vertical diversification, initiated by private service, industrial or construction firms.

This form of integration is already well advanced in France where the main private distribution companies - Générale des Eaux, the SAUR and Lyonnaise des Eaux (which recently merged with Dumez, one of the leading firms in the French construction industry) all do more than simply operate the networks: engineering, construction works, water treatment and even sometimes equipment manufacturing.

In the United Kingdom, the Bewater group, pipe manufacturers and engineers, has taken over two water distribution companies.

- ❖ Distribution companies which are seeking to develop their operations abroad. Here too, the large French groups appear to be the prime movers in the sector.

Table 5
Water distribution
Estimated turnover for the sector

| | Price of water (1988) | Million m ³ distributed | Estimated turnover (million ECU) |
|-----------------|-----------------------|------------------------------------|----------------------------------|
| Belgique/België | 0.80 | 662 | 530 |
| Danmark | 0.34 | 630 | 214 |
| BR Deutschland | 0.92 | 4 459 | 4 102 |
| España | 0.26 | 2 940 | 764 |
| France | 0.669 | 4 700 | 3 144 |
| Italia | 0.207 | 5 000 | 1 035 |
| Luxembourg | 0.527 | 34 | 18 |
| Nederland | 0.726 | 1 100 | 799 |
| United Kingdom | 0.464 | 5 310 | 2 464 |

Source: BIPE

Backed by considerable experience acquired on a large domestic market, ample financial resources and free from any administrative constraints, French water distribution companies have been buying or acquiring holdings in foreign companies for a number of years. Having established themselves throughout Spain (Lyonnaise des Eaux owns the private water distribution company - AGBAR, while Générale des Eaux owns SOGESUR and SAUR owns GESTAGUA), French companies are now reinforcing their presence in Italy, Portugal and naturally in the United Kingdom, where privatisation has opened up considerable prospects for expansion.

At the same time, the Water Authorities which are also large, highly integrated companies with their own engineering and often, manufacturing facilities, can, thanks to privatisation, export their knowledge. Preparations are already under way as the Authorities seek to strengthen their international alliances (alliances with French companies, the alliance between Yorkshire Water and the Dutch water treatment firm ESMIL, the alliance between Northumbrian Water and the American company Starstream concerning

cables).

In spite of some resistance therefore, water distribution firms in Europe have responded to the partial or total privatisation of their sector and are now firmly geared towards vertical integration and internationalisation of the management of water supply networks in most EC countries, with the exception of Germany. The next stage, the first signs of which have already emerged in France and United Kingdom, will probably be a tendency for these same companies to diversify towards other environmental services (waste management, maintenance of public highways and green areas) but also other related activities such as communication networks (cables) or energy distribution (oil, gas). In order to register the importance of this diversification strategy on the part of large water companies, it must be noted that out of the 10 largest environmentally aware industries in Europe, six originated in the water distribution sector.

Outlook

The activities of the water distribution sector will continue to be behind the purification-disposal sector which will be the focal point for most of the policies on water.

It seems likely however, that the volume

Table 6
Water distribution
Main EC companies, 1988
(Billion ECU)

| Companies | Turnover environment |
|---|----------------------|
| Générale des Eaux (France; services: water + waste) | 2.8 |
| Lyonnaise des Eaux (France, services: eau + déchets) | 2.1 |
| Thames Water (U.K.: water services) | 0.9 |
| Sevent trent water (U.K.: water services) | 0.7 |
| La Saur (France: water services) | 0.4 |
| L'ACQUA (Services and engineering) | 0.3 |

Source: BIPE

(in m³) of water consumed will continue to grow steadily (in agriculture, industry and households) in most EC countries. Regular adjustments in supply aimed at satisfying the increase in demand will probably give rise to additional investments relating to capacity. In addition, under the twofold effect of EC regulations and greater consumer demand, the sector should be rapidly modernised due to renovation programmes and automated networks. Recent problems connected with drought, moreover, should lend added impetus to the quest for safer supplies and more effective management in the event of a crisis. These tendencies do not, however, apply to the Federal Republic of Germany, since it has already foreseen most of the evolutions described. In the future, its consumption is expected to remain stagnant.

Farmers, who are primary net consumers, in terms of volume not restored to inland waters should be more closely involved in the management of water not only as regards its rational use but also in the fight against pollution. It is a well-established fact that agricultural production is one of the main causes of water pollution.

From a technological point of view, the

Table 7
Water distribution
Forecast

| | 1992 | 1994 |
|----------------------------|--------|------|
| Annual average growth rate | + 10 % | + 6% |

Source: BIPE

main developments will be in the following areas:

- ❖ the fight against pollution (monitoring rivers, warning stations, fight against accidental "micro" pollution);
- ❖ the automation of the networks (remote monitoring, centralised technical management);
- ❖ water management in the event of a crisis (improving the safety levels of supplies).

Increases in the price of water and the privatisation of networks should release the extra financial resources needed in order to modernise the sector. Although price changes are difficult to predict and will depend on current levels, we can expect prices to double in those countries where prices are kept at an artificially low level and where privatisation is now well under way (namely the United Kingdom, France, Italy and Spain). These forecasts do not

apply to Germany, for the reasons previously mentioned; consumption will remain stagnant in Germany. As for the other countries, prices are soon to be adjusted (1991 and 1992) strongly boosting their activities. Later on, the rate of increase will slacken off but, following the investments made, will enable companies to steadily improve the quality and volume of the water distributed.

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