SOLID WASTE TREATMENT AND RESOURCE RECOVERY IN THE EUROPEAN ECONOMIC COMMUNITY (EEC) A STATUS REPORT

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ABSTRACT
Legislation for solid waste treatment and resource recovery is undergoing a major change in Europe right now. A summary of these changes plus an indication of what is happening in treatment techniques and new research is covered.

INTRODUCTION
This paper will outline the present state of the Solid Waste Treatment and Resource Recovery Market Environment in the European Economic Community thereafter named EEC or Common Market; status report on legislation at the EEC and national levels will be followed by a description of treatment techniques today, trends for the future, and some specific examples of research that are being carried out.

STATUS OF LEGISLATION IN THE EEC

The European Economic Community is presently composed of nine countries: West Germany, France, Italy, Holland, Belgium, and Luxembourg (the original six members) plus Denmark, Ireland and the United Kingdom (the three recent additions). The total market population of 255 million exceeds that of the United States by a wide margin.

When joining the EEC, member countries agree to a long series of treaties and regulations aimed at suppressing trade barriers, discriminatory laws and regulations, and promoting the free movement of people, goods and industries. Members also agree to attempt to harmonize their national legislation in accordance with EEC policy objectives. When the EEC adopts new objectives, each individual country must vote laws to achieve at least the spirit if not the letter of these new objectives.

Up until recently, there was little in the way of EEC policy for Solid Waste Treatment and Resource Recovery. This has abruptly changed. On July 15th, 1975, the EEC adopted a new Council Directive which sets the overall guidelines for the elimination of waste and recovery of resources within the EEC. The general orientation of this Directive is as follows:

1) Reduction of Wastes: Recycling of materials and the replacement of primary materials by secondary materials where possible should be encouraged.

2) Protection of the Environment: Wastes should be disposed of properly and without risk to water, air, soil, plants or animals, and without noise, odors or visual impact.

3) Organization – Authority will be designated to implement planning, organization, authorization, and supervision of waste disposal operations.

4) Authorization – Any installation for waste treatment, storage, or tipping will be required to hold a permit given by the above mentioned authority. This permit will specify how treatment and disposal can be effected.

5) Control – Any holder of waste will be required to have it handled by a public or private
collector, or to dispose of it on the premises in accordance with the specifications of the duly issued permits.

6) Polluter Pays — The cost of disposal will be borne by the generator of the wastes.

7) Reports to the EEC — Each member country will submit a report to the EEC Commission every three years giving details about compliance with the above requirements.

Within the next two years, the member countries are required to adopt sufficient laws and regulations to implement these objectives.

To understand what changes in national legislation will be required, a brief description of the status of legislation in each of the member countries follows:

BELGIUM: Solid waste has been traditionally legislated at the local level. Some particular problems are dealt with at the national level (for example: Arrêté Royal of December 1970, forces communities to collect waste, and Arrêté Royal of January 1969, defines household wastes). Since September, 1970, Solid Waste Disposal facilities have been placed under the jurisdiction of the Ministry of Public Health.

Unfortunately, it is difficult to apply the penal aspects of Belgian waste laws since it is nearly impossible to identify the guilty parties (for example: cases of clandestine, illegal dumping). New legislation could be aimed at recuperating and utilizing wastes not covered by existing laws, some of which date back to the late 18th Century.

DENMARK: Existing legislation is quite fragmented and is essentially an offshoot of public health laws. In rural counties, public health commissions have the right to specify standards (e.g., containers for household wastes). The County Council or city authorities as well as the construction authorities must approve of any new locations for landfills. Existing laws contain both obligations and prohibitions, but their penal implications are obscure.

The Department of Environmental Planning and Consideration will suggest new legislation in this area. Central planning will be carried out at the national level with implementation to be the responsibility of the counties.

FRANCE: On July 16th, 1975, a new law² was passed in France dealing essentially with the same general problems as outlined by the EEC Directive. However, there are two special features of the new French law. First, the government can impose requirements for the usage of certain percentages of recycled materials in certain industries when environmental protection or material shortages so warrant. Secondly, a National Agency for Wastes will be created. This agency will be funded by taxes related to the generation of wastes (for example: levies on non-returnable bottles), and will disburse these funds for research and establishment of waste treatment facilities. A similar establishment is already functioning for water pollution and treatment problems.

WEST GERMANY: Prior to 1972 solid waste legislation was highly fragmented among federal, Lander and municipal laws. In June 1972, a national law (Abfallbeseitigung Gesetz) was approved which imposes national disposal standards, but leaves implementation and financing at the level of the Landers. The Federal Government may take action in the areas of non-returnable containers and packaging when their disposal would prove too costly for the Landers to undertake. A new Federal law dealing with transport of dangerous substances will likely be enacted in the near future.

IRELAND: The Public Health Act, 1878, provides that the municipalities and local sanitary authorities shall administer waste disposal under the aegis of the Local Government Board. All matters of house refuse collected by the sanitary authority may be sold or otherwise disposed of according to the act. The desirability of enacting new legislation for waste treatment and particularly for the operation of private waste disposal operations is being examined, but no new laws are presently being prepared.

ITALY: The most recent solid waste law was passed in Italy in 1941. This law governs the collection, transportation and disposal of wastes by the municipalities. Also indicated is the framework in which contracts may be given to private industries for waste treatment and the obligations of the contracting parties. No new legislation is currently being planned.

NETHERLANDS: Existing legislation is fragmented and there is no statutory comprehensive solid waste management law. Municipal activities are regulated according to overall health and sanitation ordinances (for example: there exists a law prohibiting further pollution of the ground). At present, priority is given to implementing legal regulations regarding hazardous wastes. However, a Government Urgency Note for the Environment holds out a prospect for an early enactment of a new law on the origin and removal
of waste matter. This law would entail a high degree of regional cooperation and provincial councils could act with force to achieve regional cooperation.

UNITED KINGDOM: Legislation concerning solid waste management is quite extensive in the UK. The Public Health Act of 1936 provides the basis from which local lawmakers may draw their general authority in matters of collection and disposal of solid wastes. Moreover, they have the right to determine both the method of collection and the place of disposal. The Greater London Council is responsible for the organization of solid waste collection and transportation with the greater London area, in accordance with local authorities. The Civil Amenities Act of 1967 obliges local authorities to select sites for land to treat wastes other than normal garbage. The Deposit of Poisonous Waste Act of 1972 is an example of legal control to arrest the serious development of haphazard dumping of harmful waste in landfill sites. A new piece of legislation, the Control of Pollution Bill has also been recently enacted, and it too deals with waste problems and the rights and duties of local authorities.

In summary, on the legislative front, the EEC is setting the overall guidelines of a comprehensive approach to not only the treatment of wastes but also to the directly related problem of the recovery of resources. Most of the individual countries of the EEC are far behind in this area, and will have to move quickly to update and reorganise their legislation to achieve harmonisation with the EEC Directive within the next two years.

As is evident from the nature of the EEC approach, the situation in Europe is quite different from that in the USA. Whereas Washington often preempts the individual states and issues legislation that is very specific, the EEC situation is one where member countries are still very jealous of their national sovereignty. The EEC Directive is a useful general orientation, but the individual states have wide scope to adopt their own distinctive legislation.

SOLID WASTE TREATMENT PRACTICE IN THE EEC

The Table below gives a brief summary picture of the waste treatment situation in the EEC today. In 1973, the combined municipal waste streams of the EEC was about 64 million MTU 70.5×10^6 t or an average of .7kg (1.5 lb) per capita per day.

Averages per country do not vary too much from this overall average, but there are noticeable differences between urban areas where averages come closer to 1kg per day (2.2 lb) and rural areas where the average is around .7kg (1.3 lb).

The average composition of municipal solid waste in Europe is: Paper 26.5 percent, Ferrous material 4.7 percent, Aluminum 0.5 percent, Glass 13 percent, Textiles 2.9 percent and others 52.4 percent. Compared to average composition in the USA, we find less paper and aluminum but more glass and plastics.

In terms of waste treatment, landfilling is used for over three fourths of all waste disposal followed by incineration which accounts for about 17 percent. Composting and other methods are small in significance.

RESOURCES RECOVERY IN THE EEC

The recovery of various types of resources has been a feature of countries of the EEC for a long time. A brief description of these activities in each member is given below.

BELGIUM: Recovery of heat in several incinerators, a small amount of composting and some source separation and recovery of glass and paper.

DENMARK: Composting and some voluntary collection of paper.

FRANCE: Several large incinerators with heat and energy recovery, some composting, automobile shredding and some recent source separation and recovery of paper.

WEST GERMANY: Incinerators with heat and energy recovery, composting, voluntary collection of paper.

IRELAND: Some recycling of glass and voluntary collection of paper.

ITALY: Incinerators with heat and energy recovery, composting, dry separation of wastes and recovery of paper and other materials in two plants.

NETHERLANDS: Incinerators with heat recovery, residue treatment, composting, some source separation.

UNITED KINGDOM: Heat recovery from incinerators, composting, source separation and voluntary collection of paper on a large scale, recovery of other materials in reclamation centers.

In sum, practice varies very much from one country to another. Recovery of heat or energy from incinerators was developed and has been implanted in Europe for quite a while, and new
### TABLE 1
SOLID WASTE TREATMENT PRACTICE IN THE EEC IN 1973

<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Land.</td>
<td>Inc.</td>
</tr>
<tr>
<td>Belgium</td>
<td>9.7</td>
<td>3.0 (3.3)</td>
<td>80</td>
</tr>
<tr>
<td>Denmark</td>
<td>4.9</td>
<td>1.5 (1.6)</td>
<td>58</td>
</tr>
<tr>
<td>France</td>
<td>51.0</td>
<td>13.0 (3.3)</td>
<td>70</td>
</tr>
<tr>
<td>West Germany</td>
<td>61.5</td>
<td>16.0 (17.6)</td>
<td>78</td>
</tr>
<tr>
<td>Ireland</td>
<td>3.0</td>
<td>0.6 (0.7)</td>
<td>no data available</td>
</tr>
<tr>
<td>Italy</td>
<td>54.0</td>
<td>11.0 (12.1)</td>
<td>no data available</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>0.3</td>
<td>0.1 (0.1)</td>
<td>no data available</td>
</tr>
<tr>
<td>Netherlands</td>
<td>13.2</td>
<td>3.5 (3.9)</td>
<td>60</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>55.6</td>
<td>15.0 (16.5)</td>
<td>90</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>253.2</strong></td>
<td><strong>63.7 (70.2)</strong></td>
<td><strong>78.7</strong></td>
</tr>
</tbody>
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Source: Centre de Planification des Ressources, 1975.

Land. = Landfill  Inc. = Incineration  Comp. = Composting

The usage of composting material from municipal waste treatment plants has had a run of popularity but now seems to be on the wane. Dry separation of a municipal waste stream has been in operation for several years in Italy. Source separation, however, shows the greatest variation being very well developed in the United Kingdom, and hardly practiced at all in France.

### FUTURE TECHNIQUES FOR RESOURCE RECOVERY

Looking at Europe in total, three trends for the future can be clearly seen. There will be substantial growth in the separation of waste streams at the source, expansion and improvement in existing treatment practices, and research for development of new systems.

Source Separation: It is now widely recognized that source separation is the most promising technique in the short run for the augmentation of recovery of resources. The reasons for its attractiveness are several: small financial investment, ease of implementation, possibility to be coupled to an existing treatment system, and good quality of recovered materials.

Source separation is now promoted by the EEC and by individual governments. The reason is that there will be a huge deficit in paper pulp by 1985 and that an increased use of waste paper is necessary. Collection by source separation is felt to be a good solution particularly because this generally involves the least amount of destruction of fibres and contamination. Several experiments are underway in all of the EEC countries. A more systematic approach is taken by the French Government, which has asked us to complete a manual for the implementation of source separation. This handbook deals with the many aspects of materials recovery problem, functioning of the markets for secondary materials, methods of collection, how to organize and run publicity campaigns, techniques of administration, etc. The handbook is provided free to any municipality that requests it, and a team of specialists can also be sent by the government (Ministry of the Environment) to help communities implement their collection programs. Subsidies are given to municipalities experimenting with source separation and collection techniques. It is probable that the EEC will attempt to make such a handbook available for all countries in the Community.

Upgrading of Present Techniques: There are several examples of the upgrading of present techniques in the EEC, one of which is particularly illustrative of the new orientation of private enterprise and public services working together to reduce waste and recover resources. In Holland, where there is a large scale coordinated system for collection and rail shipment of municipal solid wastes from a large number of communities to a central treatment point, several private companies will join the waste treatment group to build a new facility for the detinning of ferrous wastes screened...
from a huge composting operation. Improved composting, better ferrous recovery, and a new source of tin will be the result. Detinning in conjunction with municipal waste treatment will also be initiated soon in the United Kingdom.

New Systems: There are a number of important research projects underway in Europe designed to evolve more efficient waste treatment and recover resources. Research in pyrolysis has been more of an academic exercise so far with only one major incinerator manufacturer giving this research much attention. The major concentration seems to be on development of large scale integrated dry separation techniques which fit upstream of an incinerator. The Cecchini system in Italy, which has been operating successfully in Rome and Perugia for some time has given rise to attempts to copy and improve the design in France, West Germany, and the United Kingdom. In France, the BRGM (the equivalent of the US Bureau of Mines) has taken the approach of applying mining technology to the recovery of materials from a combined waste stream. Together with a number of important private French companies, research is being carried out using a number of presently available sub-systems such as air classification, magnetic sorting, variable density media separation, with hopes that a workable pilot plant can be developed within the next few years. The BRGM has already done considerable experimentation with the recovery of materials from incinerator residues, and now a full size plant for this purpose is to be built.

In West Germany, the Lander of Bavaria has been working with Krauss Maffei to develop a similar dry separation technique which will have the advantage of not shredding any of the input materials. A pilot plant is already operating in Munich.

In the United Kingdom, the Warren Springs Laboratory has just completed two years of work on a similar system and has a 2 ton per hour pilot plant in operation.

In Italy, the Cecchini system is already in commercial operation, and in addition to the recovery of paper, ferrous and non-ferrous materials and glass, organic matter is also recovered and converted to a sterilized feed supplement for animals.

The nature of the research that is now being carried out in Europe, the nationalistic orientations with state money coupled with major national corporations cooperating in the development of what will probably be similar systems, all lead to the suspicion that major eventual projects in this technology could be decided in national contexts, and that markets may be rather heavily restricted to within the borders of each country.

CONCLUSIONS

On the basis of such a brief presentation of a very complicated market environment it is presumptuous to draw major conclusions unless it is assumed that much of the justification comes from work that has been done but hardly mentioned above. With this explanation, the following general statements can be risked. The future of the waste treatment and resource recovery market in Europe will involve increasing expenditure each year for equipment and services. New laws, new standards, and much more complicated decision-making situations will occur. The approach promises to be much more comprehensive and coordinated. More materials will be recovered, some traditional secondary material markets will be inundated with new volumes of materials that will nearly overwhelm them. Many new machines and technologies will be developed, but will find to the frustration of their designers and promoters that some of the costly solutions that they achieve can also be accomplished by non-mechanical solutions which require no more than administrative and organizational changes. Already the political and social consequences of the new orientations are profound. These will increase in the future.