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A Market Approach to Managing Solid and Hazardous Waste: Waste Exchange Clearinghouses in the United States and the European Community

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COMMENTS

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I. INTRODUCTION

The current problem of solid and hazardous waste[1] management is a graphic example of the failure of the market economy.[2] Every year, millions of tons of solid and hazardous waste generated in Western Europe[3] and the United States[4] are buried, rather than

1. The United States Congress defined hazardous waste as a solid waste (any garbage, sludge or other waste material not excluded by statute) which exhibits any of the following characteristics: ignitability, corrosivity, reactivity or toxicity. Resource Conservation and Recovery Act of 1976, 42 U.S.C. § 6903(5) (1982). This definition has been the source of much debate within and outside of the Environmental Protection Agency. The simple definition of what is and what is not hazardous waste means a great deal of time, money and effort to generators, handlers, transporters and recyclers of the designated material. *See* Senkan & Stauffer, *What To Do with Hazardous Waste*, 84 TECH. REV. 34, 40-41 (Nov./Dec. 1981).

2. "A market economy is an economic system where the decisions concerning production, distribution, and consumption are taken by individual consumers and producers with no government interferences. The more of this decision-making the government reserves for itself, the more 'managed' or 'regulated' such an economy becomes." K. HARDACH, THE POLITICAL ECONOMY OF GERMANY IN THE TWENTIETH CENTURY 211 (1976). "[B]y market failure . . . at least in allocation theory, we mean the failure of a more or less idealized system of price-market institutions to sustain 'desirable' activities or to stop 'undesirable' activities. The desirability of an activity, in turn, is evaluated relative to the solution values of some explicit or implied maximum-welfare program." Bator, *The Anatomy of Market Failure, reprinted in* MICROECONOMICS: SELECTED READINGS 425, 426 (Mansfield 3d ed. 1979).

3. The quantity of waste of every type generated each year in the European Community, *see infra* note 6, is estimated at about 1,700 million tons. This total is composed of 90 million tons of household waste, 115 million tons of industrial waste, 200 million tons of sewage sludge, 950 million tons of agricultural wastes, and 300 million tons of extractive industry waste. It is also estimated that there is a five percent annual accumulation rate of waste in the EC. 20 O.J. EUR. COMM. (No. C 130) 1, 31 (1977).

4. Every year, the United States generates over 350 million metric tons of industrial waste, of which 50 to 60 million tons are considered hazardous to the public health and environment, 130 million metric tons of municipal waste, 5 million metric tons of sewage

recovered.[5]

This Comment examines the feasibility of a market solution to the solid and hazardous waste disposal problem by analyzing the present and potential role of the waste exchange clearinghouse in waste management. It will also compare and contrast the positions of the European Community (EC)[6] and the United States[7] regarding

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sludge, 430 million tons of agricultural waste, and over 3 billion tons of mining waste. UNITED STATES GENERAL ACCOUNTING OFFICE, ENVIRONMENTAL PROTECTION: AGENDA FOR THE 1980's 7 (1982) [hereinafter cited as U.S. GAO]. However, according to the United States Congress' Office of Technology Assessment, about 255 million to 275 million metric tons of hazardous waste alone are generated annually in the United States. OFFICE OF TECHNOLOGY ASSESSMENT, UNITED STATES CONGRESS, TECHNOLOGIES AND MANAGEMENT STRATEGIES FOR HAZARDOUS WASTE CONTROL 8 (1983). The EPA estimates that the growth rate of waste is 3.5% per year. ENVIRONMENTAL PROTECTION AGENCY, HAZARDOUS WASTE INFORMATION 2 (3d ed. 1980). "[M]illions of tons of recoverable material which could be used are needlessly buried each year." 42 U.S.C. § 6901. "Although technology exists to recycle, destroy, neutralize or otherwise treat hazardous waste, California waste generators continue to be too expensive. . . . But, in comparison to Western Europe, alternative treatment technology has lagged in the United States." *See Alternatives to Dumps Considered Too Expensive for Widespread Use,* L.A. Times, Nov. 25, 1984, part I, at 33, col. 1 (discusses the economic, legal and social impediments to alternative waste disposal technology).

5. In general, the full extent of tipping (i.e., dumping), which currently accounts for 70% to 80% of all waste, represents a loss of materials because these materials could be reused economically, quite apart from environmental problems to which it may give rise. 20 O.J. EUR. COMM. (No. C 112) 1, 31 (1977). "EPA estimates that about eight percent of the municipal waste was being recovered in 1977—which was composed of seven percent by source separation at the the point of generation and one percent by mixed waste processing or energy recovery." U.S. GAO, *supra* note 4, at 7. Several Western European countries process 20% to 60% of their municipal solid waste for energy recovery. 10 ENV'T REP. (BNA) (Curr. Dev.) 1661 (1979). For the purposes of this Comment, resource recovery means the recovery of material or energy from solid waste. Recycling is the process whereby solid and hazardous waste are made reusable or transformed into new products or useable raw materials.

6. The European Economic Community (EEC) is presently composed of France, the Federal Republic of Germany, Italy, the Netherlands, the United Kingdom, Belgium and Denmark. The EEC is part of a larger body called the European Community, which combines the EEC, the European Coal and Steel Community (ESCS), and the European Atomic Energy Community (Euratom). The EEC, as the cornerstone of the European Community, provides the general governing structure for the Community. Each country has an allotted number of delegates to the Community Assembly according to its size and population. The European Community Commission and Council act as the policy-making arms of this international organization. The Commission and Council have broad and substantial legislative and executive power. Treaty Establishing the European Economic Community, 25 March 1957, 298 U.N.T.S. 3, *reprinted in* W. BURHENNE, ENVIRONMENTAL LAWS OF THE EUROPEAN COMMUNITY 20-101 (1976-1981).

7. Emphasis will be upon the RCRA of 1976, the seminal legislation regarding waste management and the actions of the EPA concerning waste management. In addition, several states have waste exchange programs in operation which will be analyzed.

waste exchanges.

The analysis will begin in Part II by discussing the EC's and the United States' general legislative foundations for waste exchange and recycling. Emphasis will be placed upon the goals and principles for better waste management found in the European Council Declaration on the Programme of Action of the European Communities on the Environment of 1973[8] (the 1973 Programme), its 1977[9] and 1982[10] appendices, and the United States Resource Conservation and Recovery Act of 1976 (RCRA).[11] Part III will discuss the various strategies and tactics that the EC and the United States Environmental Protection Agency (EPA) have taken to create market opportunities for waste exchanges. This section will also compare the relationship between the national and international governing bodies, the EPA and EC, and member states (particularly California and West Germany) regarding waste exchanges. The final section will synthesize the points raised in the preceding sections in order to develop an understanding of the interrelationship of markets, government, industry, the public, and market facilitators in the solid and hazardous waste and resource management context.

A. Market Economics and Waste Pollution

The burgeoning hazardous and solid waste disposal problem can be attributed to the fact that today's industrialized market economies are not the same as Adam Smith's ideal market economy.[12] Ideally, the market economy is guided by an "invisible hand," causing every producer of goods and services to promote an end which is not necessarily intended by him.[13] Thus, while each producer is seeking his own economic goals, producers incidentally promote so-

8. 16 O.J. EUR. COMM. (No. C 112) 1 (1973).

9. 20 O.J. EUR. COMM. (No. C 139) 1 (1977).

10. 26 O.J. EUR. COMM. (No. C 46) 1 (1983).

11. 42 U.S.C. § 6903.

12. Kneese, *Natural Resources Policy 1975-1985,* 3 J. ENVTL. ECON. & MGMT. 253, 256 (1976).

13. 1 A. SMITH, AN INQUIRY INTO THE NATURE AND CAUSES OF THE WEALTH OF NATIONS 456 (Glasgow ed. 1976).

> By preferring the support of domestick to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it.

Id.

cietal interests more effectively than when they purposefully promote those societal goals through the interaction of competing self-interests.[14] If an ideal market economy existed, industries would discover that the economic incentives not to pollute, developed by competitive markets, outweigh the benefits of pollution. Present market economies fail to achieve the ideal market, because they do not meet the following structural requirements:

(1) all markets must be competitive;[15]
(2) all market participants must be fully informed;[16] and
(3) all valuable assets in the economy can be individually owned and managed without violating the first requirement.[17]

Stated another way, industries that create air, water and solid waste pollution create external diseconomies of production[18] that prevent the market economy from attaining *Pareto optimality.*[19] The

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14. *Id.*

15. Perfect competition means that no specific firm or individual can influence market prices significantly by decreasing or increasing the supply of goods and services offered by that specific economic unit. Kneese, *supra* note 12, at 255. *See generally* E. MANSFIELD, ECONOMICS: PRINCIPLES, PROBLEMS, DECISIONS (2d ed. 1977).

16. Market participants, suppliers and consumers of goods and services should be fully informed as to the quantitative and qualitative characteristics of goods and services and the terms of exchange among them. Kneese, *supra* note 12, at 255.

17. These assets include common property resources such as air, water and ecological systems. *Id.* This concept of private ownership of common property resources is a novel idea, best exemplified by the Maryland Economic & Community Development Department's proposal for a statewide program for banking and marketing air pollution rights. The proposal would allow an industry or company with low pollution levels to store air quality credits, which it could later sell, trade or use for itself. *A Bank for Marketing the Right to Pollute,* BUS. WK., Aug. 18, 1980, at 29. *See generally* Krupnick, Oates & Van De Verg, *On Marketable Air-Pollution Permits: The Case for a System of Pollution Offsets,* 10 J. ENVTL. ECON. & MGMT. 233 (1983) (discusses the capacity of a pollution-offset system, based upon marketing of emission permits, to achieve air quality standards at minimum fiscal and administrative costs).

18. An external diseconomy of production is an economic situation which occurs when an action results in uncompensated costs to others. E. MANSFIELD, *supra* note 15, at 699. *See also id.* at 237; Kneese, *supra* note 12, at 257.

19. *Pareto optimality* is a situation where all market participants are economically satiated. The market forces of supply and demand have achieved equilibrium by meeting all of the economic needs of all of the market participants. Therefore, if one person wanted to increase his economic satisfaction, it would be at the expense of another—upsetting the equilibrium. A more technical definition of *Pareto optimality* is:

> [A] situation where all possible gains from voluntary exchange of goods and services have been exhausted and no participant is willing to make further exchanges at the terms of trade which have come to exist. . . . When no more beneficial exchanges can be made, the economy has reached a situation where each individual cannot improve his own economic welfare without damaging that of another . . .

costs associated with the destructive effects of solid and hazardous waste[20] do not always directly effect the producer/polluter, but they do place a substantial burden on society as a whole.[21] Because of the disruptive nature of external diseconomies of production,[22] present market mechanisms cannot generate economic incentives for the producer/polluter to protect the environment and cease the indiscriminate dumping of solid and hazardous waste.[23]

B. The Desirability of Waste Exchanges

A waste exchange clearinghouse is an economic and administrative body that effectuates the quick, economical and convenient exchange of wastes from industry, agriculture, mining and municipalities to recyclers.[24] It maintains a confidential inventory of information on industrial wastes that are available from producers and wastes desired by recyclers.[25] The waste exchange clearinghouse supplies the three central ingredients needed for a more efficient and

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no one can be better off without someone else being worse off, Pareto optimality has been reached.

Kneese, *supra* note 12, at 256. *See generally* E. MANSFIELD, *supra* note 15; Bator, *supra* note 2, at 426-27.

20. The return of residuals (waste from industry) to nature can damage the environment, either because in the process of using original materials man has transformed them into something harmful (toxic waste) and has concentrated them in unnatural ways, or because otherwise harmless residuals react chemically with other substances or with each other in the air or water in a damaging way. A. KNEESE & C. SCHULTZE, POLLUTION, PRICES, AND PUBLIC POLICY 4 (1977).

21. E. MANSFIELD, *supra* note 15, at 435-38; Kneese, *supra* note 12, at 257.

22. E. MANSFIELD, *supra* note 15, at 699.

23. Kneese, *supra* note 12, at 257.

24. *See* Alternative Technology and Policy Development Section, California Department of Health Services, *California Waste Exchange: A Newsletter/Catalog* 3 (Oct. 1982); Senkan & Stauffer, *supra* note 1, at 39. There are many examples of market exchanges that operate in today's market economy. The New York Stock Exchange facilitates the purchase, sale and trading of corporate securities. *See generally* R. SOBEL, THE BIG BOARD: A HISTORY OF THE NEW YORK STOCK MARKET (1965); B. WHEELER, NEW YORK STOCK EXCHANGE FACT BOOK 1982 (1982). The Chicago Board of Trade provides a similar service for the bulk sale and purchase of food and raw materials. *See generally* CHICAGO BOARD OF TRADE, THE FUTURES MARKET: WHAT, HOW, WHO, WHY (1978); Chicago Board of Trade of the City of Chicago, 38(2) ANNALS 189 (Sept. 1911). Sunkist Growers, Inc. is an agricultural cooperative that acts as a marketing exchange to organize and facilitate the sale, purchase and processing of its members' citrus fruit. *See generally* C. KIRKMAN, UNITED STATES DEPARTMENT OF AGRICULTURE, THE SUNKIST ADVENTURE (1975). All of these price market institutions bring widespread market participants with varying needs and wants together in a centralized marketplace to effectuate the dynamic functioning of a particularized market, which would otherwise be less disciplined and productive.

25. *See, e.g.*, Alternative Technology and Policy Development Section, *supra* note 24, at 3-4.

rational market economy,[26] while concurrently rectifying its failure to control waste pollution. The waste exchange also strengthens the market's capacity to manage waste disposal by changing the structure of market economy incentives, improving competition, and reducing the level of direct government regulation.[27]

By facilitating the exchange of waste between the producer and the recycler, the waste exchange clearinghouse creates and enhances economic incentives for both parties. The waste exchange clearinghouse fosters a supplier-consumer relationship between the producer of waste and the recycler of waste through the following incentives:

(1) reduction of a producer's dependence on foreign imports of natural resources by the greater recovery of materials;[28]

(2) savings in disposal costs to the producer through increased recycling efforts;[29]

(3) savings in energy costs to the producer through the recycling effort;[30]

(4) savings to the recipient of recycled or recovered material, which is generally less expensive than virgin material;[31] and

(5) increased business for the recycling industry through the heightened awareness of a market for wastes of all types by the waste producers.[32]

All of these incentives share the common element of cost or monetary value regarding the choice of one course of action over

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26. An effective, rational market economy consists of perfect competition between market participants who are fully informed as to the quantitative and qualitative aspects of goods and services. A rational market economy would also be one where common property resources like air and water could be individually owned and managed. Kneese, *supra* note 12, at 255.

27. *Id.* at 259. *See generally* O'Neill, *Direct Empirical Estimation of Efficiency in Secondary Materials Markets: The Case of Steel Scrap,* 10 J. ENVTL. ECON. & MGMT. 270 (1983) (discusses the effect of an organized futures exchange market on recycled commodity markets and market efficiency in general).

28. 42 U.S.C. § 6901; 18 O.J. EUR. COMM. (No. C 168) 2 (1975); 17 O.J. EUR. COMM. (No. C 142) 6 (1974).

29. Alternative Technology and Policy Development Section, *supra* note 24, at 3-4.

30. *Id.*

31. *Id.*

32. For example, the demand for waste paper is expected to increase over the next ten to twenty years because of demand for waste paper created by foreign recycling firms and the increased number of solid waste to energy resource recovery plants in the United States. 12 ENV'T REP. (BNA) (Curr. Dev.) 1496 (Dec. 31, 1981).

another.[33] These alternative cost incentives communicate to the polluting enterprises that greater economic benefits accrue with recycling. Additionally, the waste exchange's inventory of information keeps waste market participants fully informed of both the quantity and nature of waste, and the terms of exchange (including price, transportation and delivery).[34]

The waste exchange clearinghouse also improves competition among waste recyclers by creating a more favorable market for waste recycling. With greater opportunities to make a profit in waste recycling, more entrepreneurs as well as established enterprises will enter the recycling industry. As market demand for waste increases to a level equal to the market supply of waste, the market economy comes closer to *Pareto optimality* with respect to waste management.

Finally, the waste exchange clearinghouse solves the waste disposal problem by enhancing market efficiency instead of replacing the market with bureaucratic government decision-making. Although the waste exchange clearinghouse will not completely eliminate the need for government regulation, it will reduce the direct role of government regulation in waste management.

By expediting the transfer of waste from producers to recyclers, the waste exchange clearinghouse generates market incentives that lead to the reduction of both wastes going to landfills[35] and the consequential risk to human health and the environment. Thus, the waste exchange attempts to fuse profit-minded interests of waste producers and recyclers with societal goals in a manner not unlike Adam Smith's "invisible hand."

II. Legislative Foundations of the Waste Exchange

A. Recognition of the Problem of Waste Disposal

In order to reduce or eradicate the threat that solid and hazardous wastes pose to the public health and the environment, government, industry and the general public must recognize the magnitude and urgency of the problem. How this problem is expressed directly influences the type and extent of action governments and industries take to solve the problem.

33. J. Gwartney, Economics: Private and Public Choice 16 (1976).
34. Kneese, *supra* note 12, at 257-58.
35. Alternative Technology and Policy Development Section, *supra* note 24, at 3.

1. European Community

In 1973, the EC established its first Programme of Action on the Environment.[36] The 1973 Programme was based on the notion that the elimination of industrial and consumer wastes was posing an increasingly difficult, costly and complex problem for municipal authorities.[37] The EC also regarded certain industrial and toxic wastes as an important problem because of their toxicity and non-degradability.[38] The EC then augmented its initial position on toxic wastes in 1976 when it stated that the "essential objective of all provisions relating to toxic and dangerous waste disposal must be the protection of human health and the safeguarding of the environment against harmful effects caused by the collection of toxic and dangerous waste as well as its storage and tipping [i.e., dumping]."[39]

2. United States

In 1976, the United States Congress passed the Resource Conservation and Recovery Act, which viewed the waste disposal problem as the consequence of advanced technological manufacturing, continued economic and population increases, and concentrated urban conditions.[40] Congress found these developments created "serious financial, management, intergovernmental, and technical problems in the disposal of solid wastes . . . ."[41] Congress also recognized the inadequacy of existing federal environmental laws in preventing unsound disposal of solid and hazardous waste.[42] Furthermore, Congress determined that hazardous waste presented special dangers to health beyond those associated with non-hazardous waste.[43] Most significantly, Congress regarded hazardous waste as an area that "requires a greater degree of regulation . . . ."[44]

B. Goals and Principles of Waste Management

Following the recognition of the problem, the EC and the

36. 16 O.J. EUR. COMM. (No. C 112) 1, 28 (1973).
37. *Id.*
38. *Id.*
39. 19 O.J. EUR. COMM. (No. C 194) 2 (1976) (Proposal for a Council Directive on Toxic and Dangerous Wastes).
40. 42 U.S.C. § 6901(a)(1)-(3).
41. *Id.* § 6901(a)(3).
42. *Id.* § 6901(b)(3).
43. *Id.* § 6901(b)(5).
44. *Id.*

United States have taken positions on possible solutions to the solid and hazardous waste problem. Both agree that the problem extends beyond regional boundaries and is a matter that requires international, as well as national, action.[45] The EC and the United States, however, differ slightly in their respective philosophical approaches to the problem.

1. European Community

The EC's environmental program is predicated upon promoting throughout "the Community a harmonious development of economic activities, a continuous and balanced expansion, an increase in stability, an accelerated raising of the standard of living and closer relations between the States belonging to it."[46] This guiding organizational ethic is incorporated in the EC's goals regarding waste disposal. The EC believes that the ideal environmental policy:

> consists in preventing the creation of pollution or nuisances at source, rather than subsequently trying to counteract their effects. To this end, technical progress must be conceived and devised so as to take into account the concern for protection of the environment and for the improvement of the quality of life at the lowest cost to the community. This environment policy can and must be compatible with economic and social development. This also applies to technical progress.[47]

Thus, the EC centers its environmental programs on several governmental, economic and social principles. Fundamentally, the EC seeks to tailor its governmental and economic action to the type of pollution and geographical area involved.[48] As a consequence, if an environmental program is best administered at a particular governmental level, it will remain there without risk of preemption by competing or higher levels of government.

The EC environmental program coordinates the major aspects of environmental policy in individual countries to end the isolated planning and implementation of these policies, because national

45. The elimination of wastes in the EC "require[s] a solution extending beyond the regional framework and possibly even beyond national frontiers." 16 O.J. EUR. COMM. (No. C 112) 1, 28 (1973). Waste disposal has "become a matter national in scope and in concern and necessitate[s] federal action . . . ." 42 U.S.C. § 6901(a)(4).

46. Treaty on the European Economic Community, *supra* note 6, art. 2.

47. 16 O.J. EUR. COMM. (No. C 112) 1, 6, para. 1 (1973).

48. *Id.* at 7, para. 10; 26 O.J. EUR. COMM. (No. C 46) 1, 4, para. 6 (1983).

programs in these fields (air, water, noise, waste and nuclear) should be harmonized within the Community.[49] According to this principle, the EC orchestrates the disparate environmental programs of the Member States into a balanced and united governmental front against all kinds of pollution. The EC is also careful to harmonize only the "major aspects" of the Member States' environmental policy, thus allowing the Member States to fit the EC environmental programs to their respective needs and achieve "actual progress at the national level."[50]

A primary concern and objective of the EC environmental plan, however, is to harmonize national environmental policies without compromising the "satisfactory operation of the common market."[51] The EC plans to reconcile the often divergent goals of environmental protection and economic efficiency by recognizing that economic growth should not be viewed from a purely quantitative perspective.[52] Moreover, the 1982 Programme was designed in recognition of the "socio-economic context of the 1980's," which dictates that environmental regulation seriously consider "employment, inflation, energy, balance of payments and growing regional disparities . . . ."[53] This explicit linkage of environmental policy to economic policy is a unique characteristic of the EC.

In terms of social policy, the EC plans to organize a continuous and detailed educational program at all levels to sharpen the awareness of environmental problems.[54] With the general public's increasing awareness of environmental issues, the EC hopes to foster a society more responsive to environmental protection for present and future generations.[55] An additional goal of this program is to create an international political consensus about pollution control and prevention.

Finally, the EC environmental program seeks to implement an environment information procedure and network to keep Member States and industry current on developments in environmental protection, technology, enforcement and legislation.[56] This information

49. 16 O.J. EUR. COMM. (No. C 112) 1, 7, para. 11 (1973).
50. *Id.*
51. *Id.*
52. *Id.*
53. 26 O.J. EUR. COMM. (No. C 46) 1, 4, para. 6 (1983).
54. 16 O.J. EUR. COMM. (No. C 112) 1, 7, para. 11 (1973).
55. *Id.*
56. *Id.*

network is also intended to avoid individual national measures adversely affecting the proper functioning of the common market or otherwise making the EC programs difficult to implement.[57] Furthermore, the free interchange of ideas, processes, solutions, questions and warnings is the keystone to a socio-economic structure that precedes waste exchange clearinghouse development.

2. United States

In addition to coupling waste management with increased energy conservation and alternative energy source development,[58] Congress has promulgated the following economic and environmental goals:

> (1) Encourage development and use of technological alternatives to land disposal, such as waste reduction and treatment, to reduce risks resulting from releases of hazardous waste constituents into the environment;
> (2) Improve and expand data and information on hazardous wastes, facilities, and health and environmental effects which are necessary for . . . implementation of RCRA . . . by both the EPA and the States;
> (3) Improve and expand participation in RCRA . . . by the States through improved definition, implementation, and support of both Federal and State responsibilities;
> (4) Reduce risks transferred to the future, whether several years or to future generations, and reduce costs of waste management which are externalized and shifted to society in general.[59]

This program envisions the eventual transfer of the administration of these waste management programs to the states.[60] A problem has arisen, however, between the RCRA program and the states "at a critical time when the program is just beginning to be fully implemented, [because] some States believe that there are substantial impediments to providing adequate protection to the public."[61] In fact, some states refused to take responsibility over the administration of

57. 26 O.J. EUR. COMM. (No. C 46) 1 (1983).

58. 42 U.S.C. § 6901(c)(1)-(3), (d)(1)-(3).

59. OFFICE OF TECHNOLOGY ASSESSMENT, UNITED STATES CONGRESS, TECHNOLOGIES AND MANAGEMENT STRATEGIES FOR HAZARDOUS WASTE CONTROL: SUMMARY 36-37 (1983) [hereinafter cited as OTA REPORT].

60. *Id.* at 33.

61. *Id.*

RCRA.[62]

One of the states' major complaints is that they are not receiving adequate financial assistance from the federal government to implement increased responsibilities under RCRA.[63] The sparse funding and uncertainty of RCRA regulations deprives the states and municipalities of a sufficient technical information base about wastes, storage, handling, treatment and disposal, and sufficient technical personnel to carry out the regulations.[64]

RCRA's commitment to a federal-state partnership concerning waste management[65] is a hollow one. Many states feel that they are "not given sufficient opportunities to influence the formulation of federal regulations," especially when states are called upon to be the main implementers of policy.[66] Complaints have also emphasized that regional programs involving several states, counties or cities to fight indiscriminate waste dumping are not supported by the federal government and are difficult to organize.[67] Finally, states complain they are not given sufficient latitude by the EPA to develop their own programs designed to achieve the same ends as federal programs but through different means.[68]

Thus, while there is an apparent similarity in the goals and principles of the EC and the United States, there is a subtle but telling difference in the formulation and effect of environmental

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62. *Id.*

63. *Id. See also* Interview with Chris Arnold, Senior Staff Analyst, Orange County Administrative Office, in Santa Ana, Calif. (Feb. 1, 1984). Commenting on President Reagan's 1984 State of the Union address, Arnold said that she hoped that some of the planned budgetary increase for the EPA would "trickle down" to the municipal level. *See generally* Schnapf, *State Hazardous Waste Programs under the Federal Resource Conservation and Recovery Act,* 12 ENVTL. L. 679 (1982).

64. OTA REPORT, *supra* note 59, at 33; Interview with Chris Arnold, *supra* note 63. Arnold explained that a minor crisis arose over the disposal of a certain sixty gallon barrel of chemicals. None of the county agencies, from the Fire Department to the local Sanitation District, knew what to do or how to identify the chemical waste.

65. 42 U.S.C. § 6902(8). "Recognizing that states are the implementing arm of the federal hazardous waste management program, EPA Administrator William Ruckleshaus said . . . that 'we need the states as our partners on the front line in the battle against hazardous wastes.' " However, only 30 states are projected to receive final authorization of their programs by the January, 1985 deadline. Reversion of many state programs to the EPA will cause a "significant disruption to the regulated community." 14 ENV'T REP. (BNA) (Curr. Dev.) 1141 (Oct. 28, 1983).

66. OTA REPORT, *supra* note 59, at 34.

67. *Id.*

68. *Id.* For instance, California's toxic waste disposal rules are tougher than respective federal laws. L.A. Times, May 2, 1984, part I, at 3, col. 5.

principles. The EC stresses flexible administrative designs that coordinate and harmonize individual Member State policies toward common environmental goals without stripping Member States of their essential individuality. The EC also undertakes the ambitious task of trying to incorporate environmental objectives into its economic analyses and programs. The United States, on the other hand, takes a more pragmatic approach to environmental problems, relying upon obdurate federal regulations,[69] which belies the high economic costs and administrative conflict of federal and state waste management policies.[70]

III. CREATION OF A WASTE EXCHANGE ENVIRONMENT

A. Introduction

This section examines the strategies and tactics of the EC and the United States which directly and/or indirectly affect the formation of waste exchanges. Further, it studies the effect of government fiscal measures on waste exchange development. Finally, this section analyzes actual waste exchange operations in the EC and the United States. Each area of analysis will be examined in light of the following issues:

(1) Whether the subject strategy or specific action strengthens the market's capacity to manage solid and hazardous waste by changing the structure of market economy incentives;

(2) Whether the subject strategy or specific action increases the market's ability to handle waste disposal by improving competition among market participants; and

(3) Whether governmental action helps the market to solve its waste disposal problem.[71]

Although waste exchanges will not single-handedly solve the waste disposal problem,[72] they can be an integral, even pivotal, part

69. 42 U.S.C. § 6901(b)(5).

70. *See* Schnapf, *supra* note 63, at 703-17; Florini, *Issues of Federalism in Hazardous Waste Control: Cooperation or Confusion?,* 6 HARV. ENVTL. L. REV. 307 (1982); OTA REPORT, *supra* note 59, at 48-49 (planning of greater integration of environmental protection programs); and Halgren, *Recycling and Resource Recovery: State and Municipal Legal Impediments,* 7 COLUM. J. ENVTL. L. 1 (1980).

71. Kneese, *supra* note 12, at 259.

72. United States Environmental Protection Agency, *Waste Clearinghouses and Exchanges: A Summary—New Ways for Identifying and Transferring Reusable Industrial Process Waste,* EPA 530, SW-130c.1 8 (1977) [hereinafter cited as U.S. EPA] "Although information clearinghouses can assist industry, their importance should not be overemphasized." *Id.*

of a comprehensive waste management program that emphasizes a market approach. In order for waste exchanges to develop, a proper legislative, economic and technical milieu is needed. This kind of environment correlates recoverable waste streams and manufacturing processes, maximizes the benefits of waste transfer, creates a stable market for waste exchanges, and provides adequate government support and regulation.[73]

B. Waste Management Strategies and Tactics

1. Technical feasibility

One method of making markets more competitive in waste management is the collection and dissemination of information on technical advances in waste recovery and recycling, data on recoverable waste, and reports regarding the replacment of virgin with recovered materials. Information of this sort is the basis for cost/benefit analyses, loan decisions, capital formation questions, recovered waste procurement and waste sales. The more market participants know about the goods and services available to them, the more likely they are to use them for their own benefit as well as society's. Technical feasibility is the correlation of chemical and physical properties of available and recyclable waste streams and the specification of raw, virgin materials they might replace.[74] The technical feasibility needed for waste exchange development also includes the interchange of ancillary information on waste technology, treatment and recycling.

a. European Community

The 1973 Programme's strategy to counter the multiplying waste problem and effect governmental integration was to harmonize waste regulations among the Member States, exchange technical information and create an information pooling system on wastes—especially information regarding elimination and recycling methods, and firms specializing in transportation, storage or treatment of wastes.[75]

The 1982 Programme focuses on the prevention of waste and other pollution through a variety of means. One of the primary means is to improve the requisite knowledge and information about

73. *See id.* at 4.
74. *Id.*
75. 16 O.J. EUR. COMM. (No. C 112) 1, 29 (1973).

environmental hazards and make it readily available to government decision-makers, private industry and the general public.[76] "The Commission [of the European Community][77] will continue its activities concerning the dissemination of scientific and technical data on the protection and improvement of the environment . . . and in the development of a European information market and a production market of its own."[78] In this regard, the EC already has several environmental information programs under study and several in current operation.[79]

Each informational program has a common purpose, which is to broaden the coordination of environmental research, enforcement, legislation and prevention. This supply of information helps producers monitor their production levels, plan product development, systematize and conserve raw material procurement, and recycle waste. Through this network of information programs and exchanges, the EC has already taken a step toward perfecting a European environmental information market.

The 1982 Progamme's major strategy regarding waste management is built on several EC Directives.[80] An important element of both the Directive on Waste and the Directive on Toxic and Dan-

76. 26 O.J. EUR. COMM. (No. C 46) 1, 6 (1983).

77. The Commission of the European Economic Community and for the European Community is, in general, along with the Council, the governing and policy-making arm of the EC. The Commission ensures that the Treaty establishing the European Economic Community applies to all of the institutions derived from the Treaty. The Commission has the power to decide and participate in the shaping of measures taken by the Council or the Assembly and also to use the powers given to it by the Council to implement EC programs. *See* Treaty Establishing the European Economic Community, *supra* note 6, art. 152-153.

78. 26 O.J. EUR. COMM. (No. C 46) 1, 6 (1983).

79. For an index and bibliography to information sources regarding environmental protection, see 19 O.J. EUR. COMM. (No. L 31) 8 (1976). The International Referral System is a contribution by the EC to the United Nations Environmental Program. 20 O.J. EUR. COMM. (No. C 139) 1, 39, para. 226 (1977). The Scientific and Technical Information and Documentation program concerns environmental measures. 18 O.J. EUR. COMM. (No. L 100) 18 (1975). For an information system on environmental legislation among the Member States, also known as the Community Environmental Legislation Exchange (CELEX), see 20 O.J. EUR. COMM. (No. C 139) 1, 39-40 (1977). For a data bank compiling all analyses of the technology available to combat pollution, especially the best technical means available to reduce the threat of environmental pollution at minimum cost, see 16 O.J. EUR. COMM. (No. L 153) 11-12 (1973), which contains a data bank of chemicals likely to contaminate the environment in conjunction with Ispra Joint Research Centre (JRC). *Id.*

80. *Council Directive on Waste,* 18 O.J. EUR. COMM. (No. L 194) 39 (1975); *Council Directive on Disposal of Polychlorinated Biphenyls and Polychlorinated Terphenyls* (PCB's and PCT's), 19 O.J. EUR. COMM. (No. L 108) 41 (1976); *Council Directive on Waste from the Titanium Dioxide Industry,* 21 O.J. EUR. COMM. (No. L 84) 43 (1978).

gerous Waste that advances technical feasibility is a waste identification or manifest system.[81] This identification is invaluable to the technical feasibility needed for the operation of a waste exchange clearinghouse. The Directive on Waste mandated that all Member States implement a waste handling permit program requiring all waste handlers to disclose the type and quantity of waste to be treated, general technical requirements, precautions to be taken, and the origin and destination of the waste.[82]

A more specific waste identification program is outlined in the Directive on Toxic and Dangerous Waste.[83] Whenever toxic and dangerous waste is to be transported in the course of its disposal, it is to be accompanied by the following data:

(1) nature of the waste;
(2) composition of the waste;
(3) volume of mass of the waste;
(4) name and address of the producer(s) or of the previous holder(s);
(5) name and address of the next holder or of the final disposer; and
(6) location of the site of final disposal where known.[84]

Additionally, any establishment that produces, stores, disposes or transfers toxic and dangerous materials is required to maintain: (1) a record of the quantity, nature, physical and chemical characteristics and origin of such waste; and (2) the methods and sites used for disposing of such waste, including the dates of receipt and disposal.[85] The sum of this information will enable a waste exchange to correlate and direct waste from the generator to the user efficiently, safely and economically.

The final element of the EC's program to exchange technical information and create a waste information pooling system is found in the fifth adaptation to the Council Directive of 27 June 1967 on the Approximation of the Laws, Regulations and Administrative Provisions Relating to the Classification, Packaging and Labelling

81. A good definition of "manifest system" is in the RCRA. Generally, a manifest system uses a form for identifying the quantity and composition, and the origin, routing and destination of hazardous waste during transportation from point of generation to point of disposal, treatment or storage. 42 U.S.C. § 6903(12).
82. 18 O.J. EUR. COMM. (No. L 194) 39, 41 (1975).
83. 21 O.J. EUR. COMM. (No. L 84) 43 (1978).
84. *Id.* at 46.
85. *Id.*

of Dangerous Substances.[86] This Directive requires manufacturers of new dangerous substances to notify the appropriate Member State authorities[87] by completing an industry-developed "technical dossier" on the new substance containing all of the information necessary to evaluate "forseeable direct or indirect risks" it might cause to man and the environment.[88] These substances are then classified according to the degree of danger and risk.[89] The Commission of the EC receives copies of this technical dossier and disseminates relevant information to other Member States.[90] The Commission of the EC also keeps a catalogue of these new substances and has the responsibility of keeping it current.[91]

The EC also details package labelling requirements for all toxic and harmful substances.[92] Each package must clearly and indelibly show:

(1) name(s) of the toxic ingredient(s);
(2) name(s) of harmful ingredient(s) present in a given concentration;
(3) name(s) and address(es) of the manufacturer;
(4) symbols and indications of the dangerous attendants to the toxic, harmful or highly flammable preparation; and
(5) a notice of the special risk deriving from these dangers.[93]

This labelling program helps to prevent industries from dumping wastes containing materials with toxic substances by informing users of the material's hazards. Also, knowledge of toxic substances

86. 19 O.J. EUR. COMM. (No. C 260) 4 (1976).

87. *Id.* at 6; Scannel, *Chemical Production and the Environment in Certain European Countries—General Report on the Law of the EEC Member States,* in ENVIRONMENTAL LAW AND CHEMICAL SUBSTANCES: SECOND EUROPEAN SYMPOSIUM ON ENVIRONMENTAL LAW 17, 20 (H. Steiger ed. 1979).

88. 19 O.J. EUR. COMM. (No. C 260) 4, 6 (1976).

89. *Id.* at 5. There are nine categories of hazardous waste: explosive, oxidizing, easily inflammable, flammable, toxic, harmful, corrosive, irritant and dangerous for the environment. *Id.* at 6.

90. *Id.* at 21; *see* Scannel, *supra* note 87, at 21.

91. 19 O.J. EUR. COMM. (No. C 260) 4, 6 (1976).

92. Suetens, *Regulation of the Use of Environmental Chemicals General Report on the Law of the EEC Member States,* in ENVIRONMENTAL LAW AND CHEMICAL SUBSTANCES: SECOND SYMPOSIUM ON ENVIRONMENTAL LAW 119, 121 (H. Steiger ed. 1979).

93. *Id.* This directive was enacted to remove the hindrances to trade among the EC caused by differences in national provisions of the Member States on the classification, packaging and labelling of dangerous substances. 10 O.J. EUR. COMM. (No. L 196) 1 (1967). This law was also designed to monitor the introduction of new substances into the market that may cause environmental damage and to allow Member States to appraise the consequences of these new substances on man. 19 O.J. EUR. COMM. (No. C 260) 4 (1976).

before manufacturing facilitates waste separation after use, making the waste more accessible to potential users.

The EC programs depend greatly upon governmental regulation of waste and industry cooperation. The EC and its Member States are the initiators of these programs, but the result is greater market opportunities for waste exchanges. In order for market incentives to change and competition to blossom in the waste management field, a stable market for recovered waste and certain government help is needed.

b. United States

The United States' general strategy toward waste management and waste exchange clearinghouses is based upon the following principle:

> Providing technical and financial assistance to state and local governments and interstate agencies for the development of solid waste management plans (including resource recovery and resource conservation systems) which will promote improved solid waste management techniques (including more effective organization arrangements), new and improved methods of collection, separation, and recovery of solid waste, and the environmentally safe disposal of nonrecoverable residues.[94]

Much like the EC environmental programs, the RCRA outlines various waste management information and guideline programs that the EPA will institute to form the technical foundation for waste exchange clearinghouses. These programs include technical research on alternative waste management practices, the character of waste streams, and waste inventory systems.[95] Working in conjunction with several federal, state and local authorities, the EPA is to coordinate and conduct several research projects.[96] The projects which will have the greatest impact on waste exchange development are studies on the use of solid waste as fuel, the development and application of new methods of processing and recovering materials and energy from solid waste, and the identification of recoverable materials.[97]

Knowing exactly the types of waste and the extent to which

94. 42 U.S.C. § 6902(1).
95. *Id.* §§ 6981-6983.
96. *Id.* § 6981(a).
97. *Id.* § 6981(a)(4), (7), (8).

they exist in certain waste streams is especially important for emergency response, waste treatment and waste recycling. Toward this end, the EPA is to conduct a systematic analysis of the composition of solid waste streams, their potential future changes in character, and their potential uses in productive capacities.[98] The EPA is also responsible for establishing and maintaining a central reference library containing all of the studies mentioned above, as well as all other materials relating to waste management.[99] Not only is the EPA to maintain this compendium of waste management information, but it is also required to disseminate this information and all recent technical, managerial, financial and market information to interested parties.[100] This information is to be periodically supplemented by the EPA's Science Advisory Board (SAB).[101]

Although these RCRA information regulations have achieved some success, major uncertainties persist regarding how much hazardous waste is generated and the types and capacities of existing waste management facilities.[102] Not only do these uncertainties conceal the true nature of the United States' waste problems,[103] they also stymie the creation of a technical basis for waste exchange information. Absent this information, there can be little, if any, matching between the chemical and physical properties of waste streams, and the replacement of virgin with recovered materials.

The manifest system is another element of the RCRA which creates a technical basis for waste exchange. This system is designed to ensure that all hazardous waste is properly identified by quantity, composition, origin, routing and destination.[104] The manifest remains with the waste from its point of generation, throughout its

98. *Id.* § 6982(b).

99. *Id.* § 6983(b).

100. *Id.* The National Oceanic and Atmospheric Administration has developed an electronic catalog identifying the existence, location, characteristics and availability of environmental data. The agency plans to offer the data base of about 13,000 environmental files and other services as a public service. 14 ENV'T REP. (BNA) (Curr. Dev.) 1070 (Oct. 21, 1983).

101. 14 ENV'T REP. (BNA) (Curr. Dev.) 1052 (Oct. 21, 1983). The SAB has been asked by the EPA Administrator to study, inter alia, "the scientific criteria for listing and delisting hazardous wastes, testing protocols, and characterization of waste defined as hazardous." *Id.* at 1052-53.

102. OTA REPORT, *supra* note 59, at 13.

103. *Id.*

104. 42 U.S.C. § 6903(12).

(a) The manifest must contain all of the following information:

(1) a manifest document number;

(2) the generator's name, mailing address, telephone number, and EPA identification number;

transportation, and to its final destination (disposal, treatment or storage).[105] This manifest requirement applies to transporters,[106] owners and operators of waste treatment storage, and disposal facilities.[107] There is, however, no specific provision for waste recyclers or for waste exchange facilities.

By requiring industry to supply pertinent information on hazardous materials, the United States' manifest system has the capacity to function as an all-purpose monitoring system that could facilitate inspection and enforcement under RCRA, expedite the safe transportation of wastes, and help organize a rational system of waste transfer from generators to recyclers/users. However, for the manifest sytem to be effective, it must have substantial support from the states and long-term stability. This support has not been forthcoming. New York, New Jersey, Pennsylvania and Delaware all have objected to an EPA plan for a uniform national manifest system.[108] Furthermore, local authorities cite the lack of precise details in the manifest's required information as a cause of inadequate and inefficient enforcement of waste disposal laws.[109]

Both the EC and the United States have recognized the need for a technical base in order to establish a rational and informed waste management policy. The EC and the United States have taken similar actions by instituting information programs, research projects and manifest systems. One difference is the EC's long-established classification, packaging and labelling directive,[110] which re-

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(3) the name and EPA identification number of each transporter;
(4) the name, address, and EPA identification number of the designated facility and an alternate facility, if any;
(5) the description of the waste(s) (e.g., proper shipping name, etc.) required by regulations of the U.S. Department of Transporation in 49 C.F.R. §§ 172.101, 172.202, and 172.203;
(6) the total quantity of each hazardous waste by units of weight or volume, and the type and number of containers as loaded into or onto the transport vehicle.

(b) The following certification must appear on the manifest: "This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to applicable regulations of the Department of Transportation and the EPA."

40 C.F.R. § 263 (1983). Also, California has a manifest system of its own in CAL. HEALTH & SAFETY CODE § 25160 (West 1981).

105. 42 U.S.C. §§ 6903(12), 6922(5).
106. *Id.* § 6923.
107. *Id.* § 6924.
108. 14 ENV'T REP. (BNA) (Curr. Dev.) 1063 (Oct. 21, 1983).
109. Interview with Chris Arnold, *supra* note 63.
110. 10 O.J. EUR. COMM. (No. L 196) 1 (1967).

quires manufacturers of individual and industrial consumer products to meet product information and warning requirements. The United States has a comparable law in the Toxic Substances Control Act (TOSCA).[111] TOSCA, however, is plagued with the same problems that have beset the RCRA and its regulations: overdue and inexact definitions of hazardous waste and its characteristics.[112] According to EPA Administrator William Ruckelshaus, the Toxic Substances Control Act has worked well, but "the jury is still out on whether TOSCA is the best way to assure safety of new substances."[113]

2. Marketing and institutional feasibility

Whether the formation of waste exchanges can be facilitated by the existing socio-economic structure depends a great deal upon the receptivity, support and strength of markets and market institutions. Market and institutional feasibility is the second requirement for the creation of a market environment that will benefit from waste exchange growth. Market feasibility consists of many different elements, but the central element is the establishment of markets for recovered waste materials. Ancillary to this goal is the development of mutual confidence among generators, users and transfer agents of waste.[114]

a. European Community

Aware of the myriad problems that beset efforts to increase re-

111. Toxic Substances Control Act, Pub. L. No. 94-469, 90 Stat. 2003 (1976) (codified in 40 C.F.R. §§ 702-75 (1983)). This law requires manufacturers to supply the EPA with a pre-manufacturing notice of the substances it plans to put into the market and its possible hazards. Furthermore, the EPA requires that all of these substances be accompanied by a Material Safety Data Sheet that lists the contents, their character, their amount, and the emergency procedures to follow in the event of a spill. *Id.* Telephone interview with Gabriel Williamson, Legal Department, Chemical Manufacturers' Association, Inc., Washington, D.C. (Feb. 8, 1984).

112. RCRA was passed in 1976. Section 6921(a) of RCRA envisioned the publication of a list of hazardous wastes and their respective identification criteria by the EPA Administrator within 18 months of the RCRA's enactment. It was not until 1981 that a list of hazardous wastes was finally released by the EPA. Lists of Hazardous Wastes, 40 C.F.R. § 261.30 (1983). In contrast, the EC in its *Council Directive on Toxic and Dangerous Waste* listed twenty-seven toxic or dangerous substances and materials that require priority consideration. The list includes, among others, asbestos (fibers and dust), organic solvents and arsenic compounds. 21 O.J. EUR. COMM. (No. L 84) 43, 48 (1978).

113. 14 ENV'T REP. (BNA) (Curr. Dev.) 1290 (Nov. 11, 1983).

114. U.S. EPA, *supra* note 72, at 2-4.

cycling and marketing of wastes,[115] the EC has promulgated numerous actions designed to improve the market's performance in waste management by changing economic incentives, bolstering competition, and decreasing direct government regulations. These actions include:

(1) studying methods that will make the market for secondary (i.e., recycled) materials more stable and extensive;
(2) promoting waste exchanges by appropriate measures;
(3) conducting cost/benefit analyses and optimization studies as a means of arriving at a more accurate assessment of the types of processing to be used on waste;
(4) comparing a variety of organizational systems which achieve the most efficient recovery of waste, especially of toxic and dangerous waste;
(5) improving the flow of information between Community members to industrialists on the supply and demand for waste and on all information relating to waste and dangerous substances; and
(6) arousing public awareness of and encourage cooperation with waste management programs through consumer information and individual member state action.[116]

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115. 20 O.J. EUR. COMM. (No. C 139) 1, 33 (1977). The European Community outlines the main market economy problems as follows:

1. The instability, inadequacy, and unreliability of the market for secondary raw materials is caused by short-term fluctuations in the demand for primary raw materials. This unfortunate relationship translates into substantive changes in the prices of secondary raw materials. Consequently, recycling industries have a hard time obtaining investment and initiating technology programs. Furthermore, product standards often make it difficult to use secondary raw materials.
2. Shortage of exact economic data, especially the results of cost-benefit analyses and optimization models showing the most efficient processes (recycling, recovery of energy, and disposal) for the use of materials, taking into account the economic viability of such processes, the organizational costs involved, the social cost of any deleterious effects on the environment and the assessment of the social and economic consequences of an excessive use of scarce resources.
3. Inadequacy of reclamation processes which cannot be made profitable without damaging the environment.
4. The difficulty of making reclamation processes pay for themselves, because there are many operators concerned, their activities are different and they are widely scattered. Recovery processes involve coordination and cooperation among a large number of operators (for collection, sorting, transportation, processing and reuse). The recovery of materials from household refuse is particularly difficult to organize.

Id. para. 187.

116. *Id.* para. 189. Point three is discussed in greater detail in the subsection on government fiscal measures and waste exchange development. *See infra* notes 114-42 and accompanying text.

These efforts embody the market precepts necessary for a more efficient market economy—one that is self-regulating and self-correcting. As these actions take hold on the market, the EC hopes that recovered waste as a material in manufacturing and as an energy source will become competitive and stable in the long run.[117] Finally, with a greater exchange of information about waste, waste will acquire economic value as a natural resource. These processes enable waste to be bought, sold and traded like any other economic commodity.

Of special significance is the EC's unqualified support of waste exchanges expressed in point number two above. The linkage of waste exchanges with waste recovery/recycling, waste information exchange, and waste market studies make waste exchanges a key element of the EC's comprehensive waste management policy.[118] Another important point is the EC's call for greater government and industry cooperation in gathering and disseminating information about the supply and demand for waste. This flow of information will create greater confidence among generators, users and transfer agents of waste.[119]

The general public also plays a part in the EC program to expand the market for recovered waste.[120] The EC is aware that consumer habits contribute to the problem of unbridled consumption and waste generation.[121] Therefore, the public is encouraged through "information campaigns on model initiatives taken by certain industries and local authorities"[122] to cooperate with the EC's plans to conserve resources and control wastes. Member States are also asked to increase the number of markets available to recovered wastes by substituting recycled waste for virgin materials in their procurement contracts. This governmental initiative is likely to create some short-term benefits, but government action will be more effective if it institutes policies for the "rational use of raw materials."[123]

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117. O'Neill, *supra* note 27.

118. 20 O.J. EUR. COMM. (No. C 139) 1, 33, para. 186 (1977). "The aim of a waste management policy must be, with due allowance for economic and technical constraints, to avoid the generation of waste and to ensure that materials are used as efficiently as possible at every stage of manufacture and use." *Id.*

119. U.S. EPA, *supra* note 72, at 4.

120. 20 O.J. EUR. COMM. (No. C 139) 1, 31, para. 178 (1977).

121. *Id.* at 31, para. 189.

122. *Id.* at 31, para. 178, and 33, para. 185.

123. *Id.* at 31, para. 178.

Just as the general public and Member States are asked to contribute to the development of a rational, well-integrated market approach to waste management, the EC and industry also play central roles in this program. For example, besides its major planning and coordination duties, the EC has developed a system of ecological maps of European Community countries that correlates economic demand with natural supplies and geographic location. This schematic data is coupled with information on avoiding waste generation and the squandering of natural resources.[124] Through this mapping system, environmental action can be closely tied to economic planning of Member States and industry. This demonstrates a way that mutual confidence can be fostered among public and private authorities concerning waste disposal and marketing.

Industry's role in the EC's comprehensive waste management program is centered around the development of better recovery systems, more durable products, more intensive recycling, and greater use of less polluting production alternatives.[125] In many respects, industry is asked to respond to all of the socio-economic and governmental changes designed to make the common market function more efficiently and cleanly. Industry, however, is not only an instrument of change and a market participant, but also the target of all these programs.

b. United States

The United States is faced with many of the same economic barriers that stifle the market potential for recycled materials in industrial and energy uses that affect the European Community nations. To address these problems, the RCRA has authorized the Secretary of Commerce to encourage greater commercialization of proven resource recovery technology by:

(1) supplying accurate specifications for recovered materials;[126]

(2) stimulating the development of markets for recovered

124. *Id.* at 6, para. 9.2.

125. 26 O.J. EUR. COMM. (No. C 46) 1, 4, para. 6 (1983). *See also* Ferrante, *Nonhazardous Municipal Solid Waste: Another Problem—Another Solution,* 9 CAP. U.L. REV. 567, 570 (1980) (discusses the use of waste as an energy source).

126. These specifications will pertain to the physical and chemical properties of recovered materials so that they might replace virgin or primary raw materials in a variety of uses. Guidelines will also be promulgated to help federal agencies purchase recovered materials, in order to spur the growth of this infant industry. 42 U.S.C. § 6952.

materials;[127]

(3) promoting proven technology; and

(4) providing a forum for the exchange of technical and economic data concerning resource recovery facilities.[128]

In an effort to increase the marketability of recovered waste, in 1980 the EPA and Congress formally linked energy conservation with resources recovery. Citing significant savings in materials conservation, reduction of waste through material and energy recovery from waste, and concurrent savings from an alternative energy source other than scarce virgin organic materials, Congress promulgated a more intensive energy production effort through resource recovery.[129]

The RCRA also sets forth a federal procurement program to pave the way for private industry to follow in making recovered or secondary waste materials a competitive alternative to virgin materials.[130] Good intentions, however, do not always produce the desired results. This regulation authorizes federal agencies to purchase recycled goods, but it also conflicts with competitive bidding laws.[131] Competitive bidding laws require government agencies to buy virgin primary materials over recycled goods because they are less expensive.[132] For example, California statutes encourage state agencies to purchase recycled paper, but agencies are not permitted to buy recycled paper if its price exceeds the cost of virgin paper.[133] Another problem with these procurement guidelines is the definition of a recycled product.[134] For instance, standards ordering federal

127. The development of markets for recovered materials will take the form of identifying the geographical location of existing and potential markets for such materials. Furthermore, the Secretary of Commerce is to list the various technical and economic barriers for use of recovered materials. Finally, the Secretary is to help develop new uses for recovered materials. 42 U.S.C. § 6953. *See also id.* § 6983 (outlines the coordination, collection and dissemination of information regarding solid waste recovery, facilities, markets and costs).

128. 42 U.S.C. § 6951(1)-(4).

129. Solid Waste Disposal Act Amendments of 1980, Pub. L. No. 96-482, § 5006, 94 Stat. 2334, 2353 (1980) (codified in 40 C.F.R. §§ 240-71 (1983)).

130. 42 U.S.C. §§ 6962-6964. These sections outline the application, specification, enforcement and requirements for the procurement of recovered materials. All federal agencies are encouraged to "procure items composed of the highest percentage of recovered materials practicably consistent with maintaining a satisfactory level of competition." *Id.* § 6962(c).

131. Halgren, *Recycling and Resource Recovery: State and Municipal Legal Impediments,* 7 COLUM. J. ENVTL. L. 1, 9 (1980).

132. *Id.*

133. CAL. GOV'T CODE § 14784.3 (West 1981), *repealed by* 1983 Cal. Stat. 1231.

134. Halgren, *supra* note 131, at 8-9.

agencies to purchase recycled goods are so broad that industrial/production scrap is allowed to qualify as post-consumer waste.[135] Paper mills are thus able to meet recycling standards by continuing to recycle the production scrap rather than post-consumer waste, the area of most solid waste accumulation.[136]

One area of recovered materials/waste marketability where the United States has been successful, however, is the use of sludge.[137] In essence, the EPA has developed methods that improve the performance characteristics of resources recovered from sewage sludge and enhance the attractiveness of this recovered waste to available and potentially available markets.[138]

The United States has also made some progress in creating a cooperative atmosphere between government, industry and environmentalists.[139] This greater cooperation will hopefully result in a more efficient waste management program and a recovered materials market. A group of chemical industry officials, environmentalists and the EPA are looking at how they can assist the EPA in speeding cleanup work. They are also planning a permanent system to mediate negotiations between the government and waste generators.[140]

Thus, both the EC and the United States have attempted to create market and institutional avenues for greater waste material usage by the public, industry and government. The success of these programs is sometimes difficult to measure. However, the EC has demonstrated its capacity to recycle and reuse a significant percentage of its waste.[141] The United States still possesses only the skeletal structure and mechanisms needed to generate greater markets for waste materials.[142]

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135. *Id.*

136. *Id.*

137. "Sludge is the residue of materials removed from waste water, sometimes called sewage, during the process of waste water treatment." OFFICE OF WATER PROGRAM OPERATIONS, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, SLUDGE: RECYCLING FOR AGRICULTURAL USE 3 (Oct. 1982).

138. 20 O.J. EUR. COMM. (No. L 267) 35 (1977); *see also* OFFICE OF WATER PROGRAMS OPERATIONS, *supra* note 137, at 12.

139. *EPA, Industry, Environmentalists Meeting on Waste Site Cleanup Issues,* 14 ENV'T REP. (BNA) (Curr. Dev.) 1289 (Nov. 11, 1983).

140. *Id.*

141. 20 O.J. EUR. COMM. 2 (No. C 112) 1, 31 (1977).

142. U.S. EPA, *supra* note 72, at 4.

3. Legal and regulatory rationalization

For a waste exchange to operate to its fullest capacity, there is a need for a well-tailored governmental program that places effective, but not overly intrusive, controls on the production, transportation and handling of waste.

a. European Community

First and foremost, the EC has instituted a permit process that restricts and monitors the operation of any waste-related entity:

> Installations, establishments or undertakings which carry out the storage, treatment and/or deposit of toxic and dangerous waste must obtain a permit from the competent authorities. Such waste may be stored, treated, and/or deposited only by installations, establishments or undertakings holding such permits. Undertakings engaged in the carriage of toxic and dangerous waste shall be controlled by the competent authorities of the Member States.[143]

By controlling the number and type of organizations that handle waste, the EC and Member States can expand or contract the number of these organizations to the amount and type of waste being generated.

Although the EC has directed Member States to implement permit programs within certain given parameters, the final responsibility and execution belongs to the Member States. The EC only requires that these permits have information on the type and quantity of waste, the technical requirements, the precautions to be taken, the disposal site(s), and the methods of disposal.[144] This system is just one of the general EC measures adopted "to ensure an effective protection of the environment . . . [by providing] for a uniform system of permits for undertakings which store, treat and/or ship toxic and dangerous waste; whereas unauthorized holders of toxic and dangerous waste should have it stored and/or treated only by authorized undertakings."[145]

Where EC Member States have been allowed some discretion

143. 21 O.J. EUR. COMM. (No. L 84) 43, 45, para. 9 (1978).

144. *Id. See also Council Directive on Waste*, *supra* note 80, at 40-41.

145. 21 O.J. EUR. COMM. (No. L 84) 43, 45, art. 9 (1978). The Directive on Waste requires competent authorities in the Member States to plan for the rationalization of the collection, sorting and treatment of waste. The rationalization is to include data that will facilitate control, direction and monitoring of the movement and final destination of wastes. 18 O.J. EUR. COMM. (No. L 194) 39, 40 (1975).

over waste management policies, the EC has still found it necessary to implement community-wide policies. A good example of this progression is in the area of waste oil disposal. In December, 1968, West Germany enacted the Waste Oil Disposal Act.[146] This act imposed a special charge on the producer, importer or dealer of an oil product.[147] The revenue from this charge was used to support enterprises that collect, dispose of or recycle waste oil.[148] As a result of the Waste Oil Disposal Act, the West German waste oil industry became profitable and the industries that used waste oil grew more cost-efficient. This development caused an economic imbalance among Member States. France and Italy responded with waste oil taxes of their own which were lower than West Germany's.[149] Confronted with growing competitive disparities, the European Community issued the Directive on the Disposal of Waste Oil in 1975.[150] This Directive sought to create "an efficient and coherent system of treatment for waste oils, which will neither create barriers to intra-Community trade nor affect competition, [which] should apply to all such products, even those which are composed only in part of oil, and [which] should provide for their safe treatment under economically satisfactory conditions . . . ."[151] The EC was able to conform these various waste oil laws through Article 92 of the Treaty establishing the European Economic Community.[152] This article is the EC's most potent tool for establishing a uniform common market in Western Europe. It also has a concurrent effect on the rationalization of various Member State laws.

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146. Act on Measures to Ensure the Disposal of Waste Oil (Altolgesetz), 23 December 1968, BGBl, part I, at 1419 [hereinafter cited as Waste Oil Disposal Act].

147. COMMISSION OF THE EUROPEAN COMMUNITIES, STATE OF THE ENVIRONMENT: FIRST REPORT 130 (1977). *See also* Thiem, *Environmental Laws in the Federal Republic of Germany—The Position at April 1976*, 345, 358, in EUROPEAN ENVIRONMENTAL LAW: LEGAL AND ECONOMIC APPRAISAL (S. Ercman ed. 1977).

148. Waste Oil Disposal Act, *supra* note 146, § 2, *reprinted in* EUROPEAN ENVIRONMENTAL LAW, *supra* note 147, at 358.

149. COMMISSION OF THE EUROPEAN COMMUNITIES, *supra* note 147.

150. *Council Directive on the Disposal of Waste Oil,* 18 O.J. EUR. COMM. (No. L 194) 23 (1975). *Cf. Waste Oil Recovery Rule Proposal Delayed until Mid-1983, Gorsuch Says,* 12 ENV'T REP. (BNA) (Curr. Dev.) 1751 (Apr. 30, 1982).

151. *Council Directive on Disposal of Waste Oil,* 18 O.J. EUR. COMM. (No. L 194) 23 (1975).

152. Save as otherwise provided in this Treaty, any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the common market.

EEC Treaty, 298 U.N.T.S. 3, art. 92.

In an effort to study different avenues of overcoming the unwieldiness of investment into resource recovery, the European Community established the Committee on Waste Management.[153] The Committee was conceived to:

(1) formulate a waste management policy that would ensure the best use of resources and the safe and effective disposal of waste;
(2) coordinate different technical, economic, administrative, and legal measures that could prevent the production of wastes or ensure their reuse, recycling or disposal; and
(3) implement European Community Directives on waste management and to formulate fresh proposals for Directives in waste management.[154]

The most important of the Committee's three purposes is the coordination of different technical, economic, administrative and legal measures to promote the reuse and recycling of waste. A central governing body of this kind helps to stabilize market and regulatory trends, which in turn fosters capital expenditure on waste technology.

b. United States

The United States also has a permit program for any person or entity "operating a facility for the treatment, storage, or disposal of hazardous waste identified or listed under this subtitle to have a permit issued pursuant to this section."[155] One noticeable exception from the list of entities affected by this regulation is the transporter of hazardous waste. Transporters are covered by the Hazardous Materials Transportation Act, which requires "each person who transports or causes to be transported or shipped in commerce hazardous materials . . . to be registered."[156] One problem with this regulation is that any person or entity who is connected with the transportation in interstate commerce of certain hazardous materials may be required to submit a registration statement to the Secretary

153. 19 O.J. EUR. COMM. (No. L 115) 73 (1976).

154. *Id.*

155. 42 U.S.C. § 6925(a).

156. Hazardous Materials Transportation Act, 49 U.S.C. § 1805(b) (1982). The EC has a comparable law in the *Council Directive on Transfrontier Shipment of Hazardous Materials,* 26 O.J. EUR. COMM. (No. C 186) 3 (1983). For a discussion on the Commerce Clause implications of the transportation of waste, see Philadelphia v. New Jersey, 437 U.S. 617 (1978).

of Transportation.[157] This broad definition of who is required to register with the Secretary of Transportation overlaps with the permit program in the RCRA.[158]

To further complicate matters, many states also require that all waste facilities obtain a permit from the appropriate authority. California, for example, requires that all operators of hazardous waste facilities acquire a permit following the review and decision of the Department of Health.[159] Although these permits and registrations serve a useful purpose, they often "indirectly provide more disincentives than incentives for waste reduction."[160]

According to Representative Ike Skelton, Chairman of the House Small Busines Subcommittees on Energy, Environment, and Safety, "treatment of hazardous waste is constrained by complex, lengthy, and expensive procedures for obtaining a permit." Representative Skelton also stated that many businesses, small businesses in particular, did not have the time, money or expertise to acquire an RCRA waste handling permit.[161] Joel Hirschorn, senior associate of the Congressional Office of Technology Assessment, observed that " 'no matter how good and useful a new idea is for dealing with a toxic waste problem, current regulatory policies and uncertainties combined with the absence of *direct support for innovations overpower normal market forces and stand in the way of commercializing such innovations.*' "[162]

Similar to the EC's Committee on Waste Management, the RCRA created Resource Conservation and Recovery Panels composed of federal, state and local representatives, and private contractors.[163] Ideally, the panels would provide technical, marketing,

157. Hazardous Materials Transportation Act, *supra* note 156.

158. 42 U.S.C. § 6925.

159. *See* CAL. HEALTH & SAFETY CODE §§ 25200-25205 (West Supp. 1984).

160. OTA REPORT, *supra* note 59, at 17. One disincentive of the RCRA permit process is the amount of information required on the application, which includes:

1. estimates with respect to the composition, quantities and concentrations of any such hazardous waste identified or listed under this subtitle, or combinations of any hazardous waste and any other solid waste, proposed to be disposed of, treated, transported or stored, and the time, frequency or rate at which such waste is proposed to be disposed of, treated, transported or stored; and
2. the site at which such hazardous waste or the products of treatment of such hazardous waste will be disposed of, treated, transported to or stored.

42 U.S.C. § 6925(b).

161. *Panel Told Impediments Stifle Development of New Hazardous Waste Disposal Techniques,* 14 ENV'T REP. (BNA) (Curr. Dev.) 1251 (Nov. 4, 1983).

162. *Id.* (emphasis added).

163. 42 U.S.C. § 6913.

financial and institutional services at no cost to state and local governments. The panels' goal is to generate information for government use as opposed to use by private industry. State and local governments, in this scheme, are seen as the cutting edge of waste management.

There is evidence, however, that this scheme is not being implemented as planned. Some local communities have had to establish their own programs. California's Orange County Board of Supervisors recently approved a plan to create an Intra-Agency Task Force to study the feasibility of a toxic data bank by a unanimous vote.[164] This Intra-Agency Task Force, composed of the County Administrative Office, Health Department, Sanitation District, Fire Department and Sheriff's Department, were given forty-five days to organize priorities, methods and goals regarding the handling of toxic substances and disposal of waste.[165] The Task Force was also directed to advise the Board of Supervisors on whether the County should form a permanent Advisory Committee on Waste Management. The Advisory Committee would then perform many of the same functions of the Resource Conservation and Recovery Panels outlined in RCRA.[166] Chris Arnold, senior analyst of the County Administrative Office, commented that the lack of federal/state financing and program coordination precluded Orange County from adopting these measures earlier.[167]

In direct contrast to the United States' problems in waste management coordination is the EC example. Environmental protection, sound economic management of renewable and non-renewable resources, and the reduction of dependence on imported raw materials as motivations, make the EC's campaign against waste both imme-

164. Interview with Chris Arnold, *supra* note 63. The toxic data bank is a compilation of information gathered from industry regarding the types of toxic materials they use. This data bank would be used for emergency resonse and pollution prevention purposes by the ten cities comprising Orange County. *See also* L.A. Times, Jan. 1, 1984, part I, at 8, col. 4. New York Governor Mario Cuomo has recently ordered the state to organize the nation's first program compelling industries to disclose the toxic substances they use and the toxic wastes they generate. The comprehensive list will provide important information to prevent pollution and strengthen emergency preparedness. *Id.*

165. Interview with Chris Arnold, *supra* note 63.

166. *Id.*

167. *Id.* Colorado Senate President Fred Anderson, before a Senate Subcommittee, said that " 'EPA's delays, and of late, change of mind about promulgating regulations has prompted a "wait and see" attitude among many states' officials.' " *State Success at Controlling Waste, Siting Said To Hinge on Federal Program,* 12 ENV'T REP. 1750 (Apr. 30, 1982).

diate and forceful.[168] There are several reasons for this result. First, industry began to reclaim expensive raw materials used in production and to develop new recovery systems on a larger scale.[169] Another reason is that consumers learned to alter their attitudes and behaviors about waste and recycled waste products.[170] Finally, as the EC environmental program assumed a preventive character, the EC benefitted from the two-edged advantage of environmental protection measures which support and complement economic development.[171]

Each of the major EC waste directives[172] has a direct and indirect impact on the development and operation of waste exchange clearinghouses. These directives, plus EC information programs, form a technical, market and regulatory basis that can support local, regional, national and even international waste exchange clearinghouses. Although the EC's programs have not been without their shortcomings,[173] they have organized the type of governmental, industrial and public cooperation which overcomes the political, economic and social conflict inherent in international or multi-state organizations.

The United States, through TOSCA, RCRA and the Hazardous Materials Transportation Act, has developed a strong regulatory foundation in the area of waste management and resource recovery. Although the United States has been successful in placing regulations on waste generators, transporters and disposers, its success has also been a major stumbling block to achieving a balanced technical, market and regulatory foundation for waste exchange clearinghouse development. The EPA's emphasis in enforcing RCRA has

168. 20 O.J. EUR. COMM. (No. C 139) 1, 31, para. 178 (1977). *See also* 26 O.J. EUR. COMM. (No. C 46) 1, 3, para. 4 (1978). "The Community's environment policy, as indeed is true of national policies as a whole, has brought substantial results in a relatively short period and despite growing economic problems." *Id.*

169. 20 O.J. EUR. COMM. (No. C 139) 1, 31, para. 178 (1978).

170. *Id.*

171. 26 O.J. EUR. COMM. (No. C 46) 1, 3, para. 4 (1983).

172. *See* 18 O.J. EUR. COMM. (No. L 194) 39, 40, art. 3 (1975); 19 O.J. EUR. COMM. (No. L 108) 41, 42, art. 5 (1976); 21 O.J. EUR. COMM. (No. L 54) 19, 20, art. 1(c) (1978); 21 O.J. EUR. COMM. (No. L 84) 43, 44, art. 1(c) (1978).

173. [F]rom an environmental point of view, the U.S. approach to the control of the effects of chemicals in the environment, unwieldly as it seems, appears to be preferable to any European approach. On the other hand, it must be remembered that no European country has the resources of the entire U.S. and that, in practical terms, allowance should be made for this fact.

Scannel, *supra* note 87, at 25.

not been "on reducing waste generation but on management of wastes once they are generated, and EPA has not generally pursued the resource recovery aspects of RCRA."[174] Furthermore, many of the EPA's current regulatory strategies and tactics may actually act as disincentives for waste reduction and treatment activities (i.e., recycling and reclamation).[175] A senior associate for the Congressional Office of Technology Assessment stated that the most critical need now appears to be removing government impediments to companies who want to enter the waste recycling and reclamation market.[176]

The above discussion has set forth the significance of technical/informational networks, market availability, and legal/regulatory structures to the creation of an environment that can support and benefit from a waste exchange clearinghouse. The EC and the United States have been both successful and unsuccessful in achieving a more market-oriented approach to waste management. Information among waste market participants has increased due to various information programs in the EC and the United States. Market competition, however, has not yet reached a level where markets for waste can eclipse government regulation. Both the EC and the United States have used government regulation to achieve similar ends with varying degrees of success. The EC, however, has tried to maintain a moderate amount of government regulation, while the United States has relied heavily on such regulation.

C. The Economic Cost of Waste Regulations and Waste Exchange Development

"Environmental laws are a cost factor in industrial production; they run counter to industry's paramount interests, profitability and cost savings, and are opposed by industry in both enactment and enforcement."[177] For this very reason, disposal, administrative and transport costs regarding waste transfers must be balanced with the savings accrued by foregoing the use of virgin materials.[178] This section analyzes the economic costs associated with waste management

174. OTA REPORT, *supra* note 59, at 18.

175. *Id.*

176. *Panel Told Impediments Stifle Developments of New Hazardous Waste Disposal Techniques, supra* note 161, at 1251.

177. Rehbinder, *Controlling the Environmental Enforcement Deficit: West Germany,* 24 AM. J. COMP. L. 373, 374 (1976).

178. U.S. EPA, *supra* note 72, at 4.

and governmental regulations and how this might affect waste exchange development.

The incentives to forego waste disposal come in two forms: (1) the incentive to obey waste management laws or face government prosecution; and (2) the economic incentive costs of saving and potential profit through recycling waste. Probably one of the best examples of the first incentive is the Los Angeles Toxic Waste Strike Force. This arm of the Los Angeles City Attorney's Office is composed of representatives from five agencies—Los Angeles County Health Department, city fire and police, the city Bureau of Sanitation, and the City Attorney's Environmental Protection section.[179] The Strike Force is designed to bring charges against illegal dumpers of toxic chemicals and thus stem the " 'economic incentives to be dishonest' " and " 'send people to jail and thereby raise the ante' ".[180] This idea of a negative cost to industry is further stressed by Los Angeles City Attorney Ira Reiner, who believes that " '[y]our basic white-collar executive who makes a decision to dump toxic chemicals believes a fine is simply the cost of doing business.' "[181] Although the EPA is trying to rejuvenate its enforcement program, it lacks the police power that the Strike Force has to obtain evidence and impose criminal penalties.[182]

The second incentive involves a positive approach that appeals to industry's desire for cost minimization and profit maximization. Before there can be any incentive for alternatives to landfill dumping, there must be economically viable alternatives. The EC has addressed this issue by:

(1) emphasizing the prevention of waste and the design of products which facilitate recycling;
(2) concentrating on programs that feature agricultural and energy uses of waste; and
(3) encouraging the development of new technology which facilitates waste recycling or which removes the production of waste.[183]

In much the same way, the United States has sought to provide al-

179. Stein, *Toxic Waste: New Hazard for Dumpers,* L.A. Times, Mar. 22, 1984, part I, at 1, col. 1.

180. *See Los Angeles Throws the Book at Toxic Dangers,* BUS. WK., Jan. 16, 1984, at 100a.

181. *Id.*

182. *Id.* at 100d.

183. 26 O.J. EUR. COMM. (No. C 46) 1, 14, para. 29 (1983).

ternatives to landfill dumping.[184] Measures to boost the commercial viability of waste management alternatives are designed to provide waste generators with economic benefits.

There are a number of ways economic benefits can accrue to the waste generator. Where waste reduction technology is readily available and reasonably priced, the costs associated with waste reduction through changes in production may be more than offset by lower waste management costs. Also, where materials or energy can be recovered from materials before they are discarded, a profit can be made through their re-use or sale.[185]

Government funding of greater recycling efforts is another area where incentives and disincentives play a role in waste exchange development. Whether a government should use direct payments or special depreciation allowances is a matter of debate.[186] RCRA takes the more direct approach through a grant process.[187] One benefit of this direct payment program is that the government can reduce or increase the amount granted according to public policy and national priorities.[188] Furthermore, this direct payment program regarding waste management facilitates the measurement of pollution control benefits to the society relative to each dollar spent.[189] This program, however, is partially negated by the RCRA regulatory scheme.[190]

The EC is noncommittal about what fiscal measures it should

184. *See supra* notes 126-28; *contra* "Only about 10 percent of EPA's current R&D efforts for hazardous waste are developed as alternatives to land disposal. Emerging thermal, coal and physichemical treatment technologies are at a point where they could substantially benefit from more R&D support." OTA REPORT, *supra* note 59, at 23.

185. OTA REPORT, *supra* note 59, at 23. "Industry is also urged to use less hazardous materials in the production and manufacturing of products. In the face of rising costs for energy and raw materials, recycling has already established itself as an alternative, although it has limitations." *See* L.A. Times, *supra* note 4, col. 4.

186. *See* O. DELOGU & H. SOELL, FISCAL MEASURES FOR ENVIRONMENTAL PROTECTION—TWO DIVERGENT VIEWS (1976). *See also* Wall St. J., May 23, 1984, at 1, col. 5 (explains the mixed results of chemical waste taxes used by states to clean up abandoned waste dumps).

187. 42 U.S.C. § 6986.

188. O. DELOGU & H. SOELL, *supra* note 186, at 17.

189. *Id. See* Surrey, *Tax Incentives as a Device for Implementing Government Policy: A Comparison with Direct Government Expenditures,* 83 HARV. L. REV. 705 (1976) (argues that the tax incentive is inferior to a direct grant as a means of achieving social goals).

190. The current regulatory structure does not directly encourage consideration of alternative, safer and more permanent solutions to problems posed by the very complex nature of hazardous waste.

. . . .

. . . Until the private sector perceives the regulatory structures as not containing a

use to create incentives for greater resource recovery and waste prevention. The only EC program in this area is the periodic publishing of a balance sheet showing the availability of raw materials and secondary raw materials.[191] The EC also plans to initiate incentive schemes for the recovery of secondary raw materials and the extended use of products.[192] A major reason for the EC's broad language in this area is Article 92 of the EEC Treaty.[193] This article is intended to free "international trade from competitive distortions."[194] The EC's adherence to Article 92, however, has led to many problems with Member States who have tried to implement special depreciation allowances[195] for waste reduction and resource recovery technology.[196]

What is evident from the foregoing section is that government fiscal policy and the costs associated with governmental regulations can have a direct impact on the formation of waste exchanges. Fiscal measures, however, whether through direct subsidies or depreciation allowances, are not the sole answer to waste exchange development. Waste exchanges will come to fruition only through an integrated fiscal, technical, legal and market approach.

IV. WASTE EXCHANGES IN WEST GERMANY AND CALIFORNIA

In West Germany, the federal government has based its environmental policy on these principles:

(1) The Principle of Anticipation:
Environmental policy should not only concern itself with warding off imminent danger and correcting damage which

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bias in favor of land disposal technologies, investment in new treatment technology R&D and commercial development may be limited.

OTA REPORT, *supra* note 59, at 23-24.

191. 26 O.J. EUR. COMM. (No. C 46) 1, 14, para. 29 (1983).

192. *Id.*

193. EEC Treaty, 298 U.N.T.S. 3, art. 92.

194. O. DELOGU & H. SOELL, *supra* note 186, at 69.

195. Special depreciation allowances work their effects primarily with regard to possibilities for self-financing. In the year in which such special depreciation allowances are claimed, the result is a comparatively lower taxable profit.

. . . .

. . . As a result, the funds available for self-financing purposes will be increased. After the asset has been completely written off on the books, the 'financial aid temporarily granted' must, however, be gradually written back over the following years on a pro rata basis until the facility in question can no longer be used, with the result that profits will be increased.

Id. at 64-65.

196. *Id.* at 61, 68-70.

has already been caused. It should also ensure that the resources of nature are protected and conserved;

(2) The Polluter-Pays Principle:
The costs of avoiding, removing or otherwise remedying environmental damage should be borne by those who cause it. Measures to attain this end include process standards, product standards, orders, prohibitions and other specific regulations, as well as taxation provisions; and

(3) The Principle of Cooperation:
Environmental policy can only achieve viable results through a close working relationship between the Federation, local authorities, interest groups in society, and individual citizens themselves.[197]

The principles of anticipation and cooperation closely resemble those of the EC. The similarity between EC and Member State policies is an important reason for the minimal conflict within the EC and also accounts for the speedy implementation of EC Waste Directives.

The pertinent legislation in West Germany is the Abfallbesitigungsgesetz (AbfG) or the Waste Disposal Law.[198] Its primary objectives are the recycling of wastes by providing suitable processes for all wastes, creation of sufficient disposal capacity, delivery of all waste to disposal installations, and the operation of disposal plants—together known as Organized Disposal.[199] These objectives were most recently augmented in 1975 to include the goal of exploiting all possibilities of reuse and reutilization of wastes. This objective requires that each individual industry exhaust all possibilities for reuse or recycling before it is allowed to use some form of landfill disposal or treatment process.

This emphasis on the waste recycling market and the prevention of waste is further advanced by waste exchanges. The Chambers of Industry and Commerce have instituted waste exchanges (Abfallborse) to facilitate this recycling process.[200] These waste ex-

197. O. SPRINGER, ENVIRONMENTAL POLICY: PROTECTION AND MANAGEMENT OF THE ENVIRONMENT 25 (1978).

198. Waste Disposal Act (AbgG) BGBl, part I, at 873 *et seq.* (7 June 1972).

199. H. STEIGER & O. KIMMINICH, THE LAW AND PRACTICE RELATING TO POLLUTION CONTROL IN THE FEDERAL REPUBLIC OF GERMANY 251 (1976). *See also* Zalob, *Current Legislation and Practice of Compulsory Recycling; An International Perspective,* 19 NAT. RESOURCES J. 611, 624 (1979).

200. J. MCLOUGHLIN, THE LAW AND PRACTICE RELATING TO POLLUTION CONTROL IN THE MEMBER STATES OF THE EUROPEAN COMMUNITY: A COMPARATIVE STUDY 290 (1976).

changes advance West German principles of environmental policy, provide a wider scope of options to waste generators regarding their waste, and create a more organized and steady market for recyclers.[201] Through advertisements in the Chambers of Industry and Commerce journals, waste exchanges list a variety of available wastes under a code number. The waste exchanges even have sampling methods to ensure what type of waste is being exchanged.[202] Under the EC's cooperative, market-conscious waste management program and its outright advocacy of waste exchanges in its 1977 Programme, waste exchanges in Europe have achieved a permanent place in the market economy and the market solution to waste disposal.[203]

B. California

In 1972, Dr. David L. Storm of the California Department of Health Services Toxic Substances Control Division developed the California Waste Exchange. This waste exchange was an effort to reduce landfill dumping and to encourage recycling of wastes.[204] Today, the California Waste Exchange is responsible for the recycling of fifty waste items that were previously dumped.[205] Other waste exchanges across the country have also achieved some success. For example, the Midwest Industrial Waste Exchange covers forty-seven waste streams, while the Industrial Material Exchange Service includes some forty-nine waste solvents and materials.

Since 1982, the California Waste Exchange has been greatly helped by general waste recycling and specific regulations geared toward the Exchange.[206] The Department of Health Services is mandated to "encourage the reduction or exchange, or both, of hazardous waste."[207] Furthermore, the Department of Health Services is to

201. H. STEIGER & O. KIMMINICH, *supra* note 199, at 260.

202. *Id.*

203. Wasserman, *Attempts at Control Over Toxic Waste,* 15 J. WORLD TRADE L. 410, 425 (1981). Most of the Western European countries have waste exchanges on a local and regional level. The Nordic Waste Exchange (composed of Denmark, the Netherlands and Finland) and the West German waste exchanges have been the leaders in this field since 1972. *Id.*

204. Telephone interview with Bob McCormick, Waste Management Specialist, California Department of Health Services (Oct. 10, 1983).

205. Letter from Bob McCormick, Waste Management Specialist, Department of Health Services, regarding the California Waste Exchange (Oct. 26, 1983).

206. *See* CAL. HEALTH & SAFETY CODE § 25170(b), (g), (h) (West Supp. 1984).

207. *Id.* § 25170(j).

establish and maintain a waste information clearinghouse which will consist of a comprehensive record of wastes that "may be recyclable."[208] This regulation also requires every producer of hazardous waste to supply the California Waste Exchange with information on such wastes.[209] This information is made available to recyclers of waste on a confidential basis so as to protect the waste generators' trade secrets.[210] By making wastes available on a confidential basis, the California Waste Exchange hurdles a major stumbling block to the establishment of waste exchanges.[211]

The California Waste Exchange is notable as a pioneer and as one of the few waste exchanges in the United States that is state-owned and operated. Most waste exchanges in the United States are run by industry associations or chambers of commerce.[212] The California Waste Exchange benefits by having a legally mandated waste information supply.[213] On the other hand, other waste exchanges also rely upon waste generators, waste recyclers and secondary material users to make their wants and needs known to the exchange on a voluntary basis. The incentives for joining a waste exchange are many, chief among them being the economic savings of avoiding high disposal costs and the accompanying benefit of reduced materials cost.[214] All of these waste exchanges also employ the manifest system mandated by the RCRA to identify the wastes, maintain confidentiality, and match the wastes available with those

208. *Id.* § 25170(k).

209. *Id.*

210. *Id.*

211. Interview with Chris Arnold, *supra* note 63. Telephone interview with Gabriel Williamson, *supra* note 111.

212. *See, e.g.,* St. Louis Regional Commerce and Growth Association, Midwest Industrial Waste Exchange, *Clearinghouse Catalog and News* (Aug. 1983). The Midwest Industrial Waste Exchange (MIWE) is comprised of the Chamber of Commerce of Greater Kansas City, the Minnesota Association of Commerce and Industry, the Nebraska Department of Environmental Control, the Missouri Environmental Improvement Authority, and the Center for Industrial Research and Service at Ames, Iowa. *Id.* at 1. The ultimate goal of MIWE is to gain the membership of all the states represented in the Midwest Governors' Association. 12 ENV'T REP. (BNA) (Curr. Dev.) 986 (Dec. 11, 1981).

213. The California Waste Exchange has 126 wastes listed for possible recycling or purchase. *California Waste Exchange, A Newsletter/Catalog* at 13-26 (Spring 1983).

214. For example, a manufacturer had 75 drums of surplus quicklime, a hazardous waste, that he needed to dispose of, and was looking at approximately $2,000 in costs. The manufacturer contacted the California Waste Exchange which directed him to a sewage treatment plant. The manufacturer ended up selling his waste for a small profit and the purchaser at the treatment plan saved $1,200. Alternative Technology and Policy Development Section, *supra* note 24, at 6.

wanted.[215]

Waste exchanges in the EC and the United States have yet to become more than waste information clearinghouses.[216] Waste exchanges can also provide important services such as legal counseling and negotiation services.[217] The final evolutionary stage of waste exchanges would involve actual waste materials exchange. Waste exchanges would become waste brokers that buy, sell and trade waste for a profit.[218] This process would require highly skilled technical, managerial, marketing and handling facilities, as well as large capital investment.

In the past decade, waste exchanges in the EC and the United States have made progress in facilitating waste recycling. Waste exchange in the United States, however, has not reached the level of market and institutional acceptance that it has in the EC. The contrast between the EC and the United States in this area points to the need for strong initiative in the development of a proper technical, legal, fiscal and market environment for waste exchange growth. This initiative can come from the private or public sector, as evidenced by West Germany and California, respectively. Along with the necessity for positive initiatives in this area, there also needs to be a realization that private industry and government can and should combine their efforts to solve the problem of waste management. The waste exchange system can be created by government-industry cooperation; in return, the waste exchange system can generate government-industry cooperation.

V. CONCLUSION

The foregoing discussion is based upon the premise that what the market economy has wrought, the market economy can rectify. Market excesses in natural resources development, product manufacturing and disposal have created a waste management problem of substantial political, economic and social magnitude. The market has failed, or has been slow, to develop adequate countermeasures to the cancer-like growth of industrial, residential, municipal and

215. Letter from Bob McCormick, *supra* note 205. *See also* Senkan & Stauffer, *supra* note 1, at 39. Before the RCRA, there were only four waste exchanges in operation in the United States; in 1981, however, there were approximately twenty-seven waste exchanges in operation. *Id.*

216. U.S. EPA, *supra* note 72, at 7.

217. *Id.*

218. *Id.*

agricultural waste. The major causes of this market failure are cost factors,[219] misguided government regulations,[220] and persistent social habits.[221]

An integral element in the market economy's ability and capacity to correct its waste management problems is the waste exchange clearinghouse. As a market facilitator and catalyst, a waste exchange can bolster market efficiency by increasing market-price incentives to recycle[222] rather than dumping wastes in landfills. It can also provide greater opportunities for entrepreneurs to enter the waste management field. Most importantly, a waste exchange system, with its reliance upon and use of the dynamics of supply and demand, places the central focus of waste management on the market economy and its participants, instead of solely on the government.

Another major advantage of a waste exchange system is that it does not completely co-opt government waste regulations, but simply emphasizes the managerial aspects of waste regulation rather than its protective aspects. The management of waste in the environment is important for society's survival and growth, as well as for the preservation of the environment for future generations.[223] Furthermore, waste exchanges force industry to adopt policies and pro-

219. *See* text accompanying notes 12-23.

220. "Government pollution control regulations advocated pollution control only after pollution was created by industrial production, etc.: These regulations have created a 'Catch-22' situation. It takes resources to remove pollution. Pollution removal generates residue. It takes more resources to dispose of this residue. And, disposal of residue also produces pollution." Ling, *Industry's Environmental Challenge: Prevention,* 12 ENVTL. F. 21, 22 (Nov. 1982). Wet oxidation, however, is an alternative treatment method that reduces chemical wastes to nontoxic inert compounds by breaking down the molecular structure of the waste through the use of heat and pressure without residual pollution. *See* L.A. Times, *supra* note 4, at cols. 4-5.

221. For too long, Americans have seen conservation of energy and natural resources as repressive and un-American. "Use" has been the key word in both energy and natural resources management. However, viewing conservation as a mere adjustment, rather than an overhaul of our energy and natural resource consumption, can encourage changes in capital stock and daily behavior that promote energy savings in an economically and socially nondisruptive manner. Yergin, *Conservation: The Energy Source of the Future,* in ENERGY FUTURE: REPORT OF THE ENERGY PROJECT AT THE HARVARD BUSINESS SCHOOL 173, 178 (R. Stobaugh & D. Yergin 3d ed. 1983). *See also* text accompanying notes 119-22.

222. Recycling or recovery of waste frequently involves familiar technology. "One of the most important aspects is the recovery of waste heat, a major task for industrial retrofit . . . . Still another is the reclamation of waste products. To recycle aluminum, for example, requires only 7 percent as much energy as does getting aluminum from ore." Yergin, *supra* note 221, at 199.

223. Ling, *supra* note 220, at 25.

cedures for waste transfer and recovery. In so doing, waste exchanges and industry can lessen or perhaps eliminate the need for strict laws and regulations that can be counterproductive.[224]

The previous comparison of the respective waste management policies of the EC and the United States has revealed that, on the whole, the EC and the United States have promulgated similar goals, principles, programs and even specific regulations regarding waste management and resource recovery. It has also been demonstrated, however, that similarity in form does not always mean similarity in substance. It is the substance of the EC program that sets it above and apart from the United States concerning waste management and waste exchanges. The EC Programme was founded on the principles of harmonious economic development and the approximation of laws among its Member States.[225] These organizing principles enable the EC to design and implement coordinated waste management directives. With the aid of Article 92,[226] the EC is able to avoid conflicts in separate Member State policies while tailoring diverse Member State actions into a congruous whole. However, the EC's reliance on Article 92 must be lessened in order for Member States and their respective industries to develop more innovations in waste technology and resource recovery without fear of EC preemption. Especially significant for the EC is that this policy is infused with the spirit of cooperation and uniformity reflected in all EC policies, which helps to overcome inherent political and economic differences of Member States. Not only is this cooperative spirit evident on the international level, but it is also a major characteristic of national policies.[227]

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224. *Id.*

225. The Community shall have as its task, by establishing a common market and progressively approximating the economic policies of Member States, to promote throughout the community a harmonious development of economic activities, a continuous and balanced expansion, an increase in stability, an accelerated raising of the standard of living and closer relations between the States belonging to it.

EEC Treaty, 298 U.N.T.S. 3, art. 2. *Contra* Sullivan, *The Decline of Europe,* NEWSWEEK, April 9, 1984, at 44 (discusses the economic and political problems that plague Europe and the EEC in particular).

226. EEC Treaty, 298 U.N.T.S. 3, art. 92. Only recently has the EC begun to use Article 90 as its main enforcement tool. *See* Page, *Member States, Public Undertakings and Article 90,* 7 EUR. L. REV. 19 (1982). Article 90 enjoins Member States in respect of public actions to "neither enact nor maintain in force any measure contrary to the rules contained in this Treaty and in particular those rules provided for in Article 7 and Articles 85 to 94." EEC Treaty, 298 U.N.T.S. 3, art. 90.

227. *See, e.g.,* K. HARDACH, *supra* note 2, at 153-57 (discusses the centralization of legislative power and the role of public-law entities which influence economic policy by repre-

Another fundamental difference between the EC and the United States program is the priority the EC gives to the prevention of waste and the conservation of natural resources.[228] By making waste prevention a primary objective, the EC averts the "Catch-22" situation where an inordinate amount of financial, technical and human resources are used to combat waste but concurrently generate waste in so doing (e.g., incinerating chemical waste, but producing toxic fumes in the process).[229] Prevention also advances the cause of waste recovery and waste exchange, because alternatives to dumping waste are legitimized by laws that make these waste prevention measures profitable. In the same vein, the EC has embraced a policy of conserving natural resources.[230] The EC has decided to take effective action to conserve and improve the environment and to combat pollution and nuisances.[231] To this end, the EC has adopted an "adroit mixture of measures—of price, regulation, incentives, information, and research and development."[232] These are the same types of measures that help to create waste exchanges. Conservation of natural resources, prevention of waste and waste exchange development complement one another in a way that advances a market approach to waste management.

The experience of the United States is different because it has become a victim of its own regulatory devices. EPA waste management regulations can be likened to "the great beast of laws and regulations . . . sometimes randomly enacted and applied . . . that 'knows no glut, but feeding, she grows hungrier than she was.' "[233]

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senting heterogeneous groups and ideas); S. COHEN, MODERN CAPITALIST PLANNING: THE FRENCH MODEL 3-20 (1977) (discusses the features of the Monnet Plan or indicative planning, and the idea of "enlightened self-interest"); W. BAUM, THE FRENCH ECONOMY AND THE STATE (1958); J. ARDAGH, THE NEW FRENCH REVOLUTION: A SOCIAL AND ECONOMIC STUDY OF FRANCE, 1945-1968 (1969); and S. LIEBERMAN, THE GROWTH OF EUROPEAN MIXED ECONOMIES 1945-1970: A CONCISE STUDY OF THE ECONOMIC EVOLUTION OF SIX COUNTRIES (1977) (discusses the trend in Western Europe where state intervention in economic life became stronger over time and national planning eventually became an inherent feature of post-1945 European capitalism).

228. *See* text accompanying note 47.

229. Ling, *supra* note 220, at 22.

230. 20 O.J. EUR. COMM. (No. C 139) 1, 7, para. 16 (1977).

231. *Id.*

232. Yergin, *supra* note 221, at 235.

233. Ling, *supra* note 220, at 23. *See also* Chandler, *The Adversaries,* in PUBLIC POLICY AND PRIVATE ENTERPRISE, HARV. BUS. REV. 5 (Special Reprint 1983).

> In the United States, business hierarchies appeared before public ones. In Europe, the reverse was true. When the large government bureaucracies did appear in this country, the basic adversarial role of government toward business had already

By enacting a broad and deep array of regulations covering all areas of waste management, the United States has established the most comprehensive waste regulatory system in the world. Yet, at the same time, these regulations have choked the market's ability to function properly and respond to the waste disposal problem.

In order to reverse this over-regulation of the market economy, the United States must realize that environmental protection does not always mean shackling industry with numerous regulations and sanctions. "The American system is particularly responsive to incentives. Up to now, the failure of public policy has been its inability to assess the true prices and true risks of . . . alternatives [such as waste exchanges, prevention, and conservation], and its consequent inability to measure against them costs of incentives . . . ."[234] Altering the price structure to benefit recycled products and waste materials is a positive step, but is susceptible to price shocks and inflation. Furthermore, although price incentives and restructuring is an efficient method to improve market performance, it may not be equitable. Thus, public policy must correct market imperfections by taking into account the social costs of waste recycling and recovery.[235]

Consequently, a more cooperative relationship between the federal government and the states, and between governments and industry, is required.[236] Cooperation is needed to give clear and consistent signals about a pricing system for recovered waste as well as general regulations on waste exchanges.[237] Simply, the United States

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been defined; that definition had developed largely as a response of an influential segment of the business community to the rise of modern big business.

Id. at 9. Chandler also explains that in the 1960's and 1970's, "the standard American response to complex economic problems [e.g., pollution] was to pass laws creating regulatory commissions to monitor the activities of the business involved." *Id.* at 7.

234. Yergin, *supra* note 221, at 235. *See also* Skinner, *Facing the Chemical Waste Disposal: The Newco Administrative Proceeding,* 9 CAP. U.L. REV. 547 (1980). "Clearly, new types of facilities, criteria, and professional attitudes are needed to dispose of hazardous waste properly." *Id.* at 565.

235. *Id.* at 235-36. *See also* S. SCHURR, ENERGY IN AMERICA'S FUTURE: THE CHOICES BEFORE US 460-65 (1979) (a good discussion of equity and energy policy).

236. Yergin, *supra* note 221. In order to combat the increasing disparity between the various governmental and industrial approaches to waste management, it is vitally necessary to harmonize and coordinate scientific, technical and administrative efforts. This is an area where politics should be irrelevant, where economic problems can be shared and where, above all, common sense should prevail. Scannel, *supra* note 87, at 25. In Denmark, France and West Germany, for example, the government has subsidized and helped establish advanced waste treatment plants. *See* L.A. Times, *supra* note 4, at cols. 1-2.

237. Yergin, *supra* note 221, at 236. *See also* Fox, *Breaking the Regulatory Deadlock,* in

must learn to distinguish between a "caricature of a totalitarian planned market economy and the realities of well designed government policies that promote market forces rather than supplant them."[238]

Waste exchanges can be successfully established by either the government or industry, as demonstrated in California and West Germany. But whatever the entity that creates the waste exchange, it must be able to cooperate with other market participants—whether they be the government, industry or consumers. The EC experience in waste management proves that well-defined laws can guide the activities of all economic participants toward a common societal goal. The challenge to the EC and the United States is whether such a government-business structure can maintain the protections afforded by government regulation while allowing market forces to reach maximum efficiency. Finally, the rationalization of the socio-economic environment coupled with the formation of waste exchanges is not advocacy of *more* government involvement,

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PUBLIC POLICY AND PRIVATE ENTERPRISE, HARV. BUS. REV. 55 (Special Reprint 1983) (an excellent analysis of the institutional conflict in the United States between government, industry, labor and special interest groups that prevents the development of consensual problem solving). Fox states that:

> U.S. business is by now familiar with the dominant European and Japanese approach—a partnership, or at least close cooperation between business and government. These partnerships often include, besides business and government, representatives of labor and special interest groups who work to resolve problems and to build a consensus on industry rules and standards in such areas as health, safety, and environmental protection.

Id. at 57. Fox also asserts that government should be the "final arbiter of the rule or standard" which all partnership participants obey, but that industry, labor and special interest groups are responsible for identifying the problems and interpreting relevant data. *Id.* at 61.

238. *See, e.g.*, R. REICH, THE NEXT AMERICAN FRONTIER 133-38, 234 (1983) (discusses the advantages of flexible productive and administrative systems that also include some national planning); and J. GALBRAITH, THE NEW INDUSTRIAL STATE 363-64 (1971). Galbraith asserts that:

> In some places market responses still serve. Over a very large area such responses cannot be relied upon. The market must give way to more or less comprehensive planning of demand and supply. Here, if the industrial system does not plan, performance will be poor and perhaps appalling . . . . To rely on the market where planning is in fact required is to invite serious trouble.

Id. Just as the modern business enterprise appeared as a result of an increasing volume of economic activity that made administrative coordination of production, costs and markets more profitable than market coordination, the government and industry ought to join efforts to create waste exchanges that act as administrative coordinators of the waste materials market. A. CHANDLER, THE VISIBLE HAND: THE MANAGERIAL REVOLUTION IN AMERICAN BUSINESS 8 (1977) (discusses how modern business enterprises took over the functions of coordinating flows of goods through existing processes and channels of production and distribution, and of allocating funds and personnel for future production and distribution).

but *smarter* government involvement in the market economy. This enlightened approach enables the market economy to realize its potential to correct the problems it has created.

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