Chapter 7

Institutional problems in Centralized Resource Recovery: Issues and Policy Responses

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Introduction

The Nature of Institutional Problems

Change in a society is often measured by changes in the number and character of its institutions. Yet, because institutions reflect and define the way things are done, their very existence can be a barrier to technological change. Institutions such as government agencies, trade associations, and citizen groups that operate outside market arrangements often constrain actions that are desirable from an economic or technical perspective. Others, such as research institutions, support technological change by providing new ideas and people trained to accept and implement them. This chapter focuses on those institutions that can act as barriers to resource recovery, particularly centralized resource recovery where institutional barriers are highest.

Problems caused by institutions are not unique to resource recovery. They arise whenever a new technology is adopted, especially when the user is in the public sector or must work closely with the public sector, as is the case with law enforcement, education, information processing, mass transit, and also resource recovery.

Existing institutional barriers pose problems for initiating or improving resource recovery, recycling, and reuse. Some of these may be more difficult to solve than the technological and economic problems discussed elsewhere in this report. Some may even be insurmountable; the only approaches may be to circumvent them by adapting technology to them, by adopting new economic incentives or disincentives, or by establishing entirely new institutions.

This chapter addresses these specific questions:

- What is the importance of risk as an institutional issue in resource recovery?
- What are the major institutional problems for resource recovery?
- What is the origin or nature of each of these problems?
- What Federal policv options are available for addressing ‘these problems and how well might they work?

Risk as a Source of Institutional Problems

Centralized resource recovery is an uncertain activity that poses risks to those involved in it. * The large capital investments required make it a particularly risky venture. Managing this risk is at the heart of a number of its institutional problems.

A potential investor in centralized resource recovery, whether public or private, faces at least five separate sources of uncer-

*An uncertain activity is one Whose outcome Cannot be predicted exactly. The risk is a measure of the loss that would occur if the outcome is a failure—the greater the investment at a given level of uncertainty, the greater is the risk.

tainty which put that investment at risk. Public officials face political risks that arise in part, from these same uncertainties.

- Technical uncertainty—will the technology perform reliably and yield products with expected quality while keeping effluents at acceptable levels?
- Cost uncertainty—can the facility be built and operated for the projected costs?
- Revenue uncertain y—will potential customers purchase the available quantities of recovered materials and energy at expected prices?
- Waste uncertainty—will municipal solid waste (MSW) be delivered to the facility in expected quantity and with expected composition?
- Environmental uncertainty—will environmental standards change as a result of political action or if new hazards are identified?

Each of the parties to a resource recovery decision would like to reduce his risk either by reducing the overall level or by transferring it to the other parties. While institutions can provide the means to do both, they can also be barriers to effective risk reduction or risk sharing.

Some Approaches to Risk Management

A resource recovery investor can reduce financial risk in several ways:

- Diversify by means of spreading the risk by building several, perhaps smaller, facilities using different technologies with different technical uncertainties, thus reducing the overall economic risk but not the technical uncertainties of each facility.
- Use only proven technologies, thus reducing the technical and cost uncertainties.
- Seek long-term contracts for fixed quantities of inputs and for products of specified quality or composition, thus reducing the waste and revenue uncertainties.
- Use technologies with advanced environmental controls or that produce "zero-discharge, " thus reducing the environmental uncertainties.
- Seek a Government subsidy, thus reducing the economic risk, but not the economic uncertain y.
- Delay while performing research and development (R&D) or waiting for better technology to be developed by someone else, thus reducing the technical uncertainty.

Each of these approaches affects the balance sheet cost* of resource recovery, its total cost to society, and the distribution of risk among the parties-at-interest. For example, using only proven technologies reduces the economic and technical uncertainties for all the parties involved. This approach, however, could carry a high price if proven technologies are expensive. Using the approach of Government subsidy, the risk of loss to the investor is decreased by transferring it to the Government. Thus, the owner's balance sheet cost of resource recovery declines, even though the total cost to society remains the same. Similarly, long-term contracts for delivering waste of a guaranteed quantity and composition can probably be made with a community only at a lower tipping fee than it would otherwise be willing to pay. The community would want to pay less because it would forego the ability to adapt to future circumstances by offering such a guarantee. Each of these examples shows that reducing risk has a real price that someone or some other institution must be willing to pay. This is the reason that risk is an institutional problem.

Institutional Problems in Centralized Resource Recovery

Table 49 lists 17 institutional problems that frequently arise in the establish-

*A balance sheet cost is the cost of resource recovery calculated as the difference between a plant's income and its expenses. Subsidies or externalities paid by or to other parties are not included in its calculation,

Table 49.—Institutional Problems in Centralized Resource Recovery

information Problems
1. Underinvestment in research and development.
2. Inadequate information at the local level.
Jurisdictional Problems
3. Fragmented and overlapping State and local jurisdictions.
4. Cost sharing among communities.
5. Mixture of private and public roles in managing MSW.
6. Responsibility for and ownership of waste after discard ("flow control").
7. Limitations on interjurisdictional waste shipment or disposal.
8. Overlapping Federal agency jurisdictions.
Implementation Problems
9. Limited capability of local governments to issue bonds.
10. Cooperation of local waste collectors and haulers.
11. Creation of local monopolies.
12. Insufficient definition of health, safety, and environmental standards for resource recovery plants.
13. Siting of facilities.
Marketing Problems
14. Inadequate or nonexisting standards of performance for recovered products.
15. Limited authority of local governments to enter into long-term sales contracts,
16. Electric utility rate regulation that discourages use of new fuel sources.
17. High freight rates for shipping MSW and recovered materials.

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ment of centralized resource recovery. These problems are grouped under four main topics: information, jurisdictional, implementation, and marketing. Each is discussed in the following section. Subsequent sections discuss policies that could be used to address these problems.

Information Problems

1. UNDERINVESTMENT IN RESEARCH AND DEVELOPMENT

Although a number of demonstration facilities and a few commercial resource recovery plants are now in operation, considerable uncertainty remains concerning their technical and economic performance. Subsystems for recovery of aluminum, glass, and mixed nonferrous metals have not been operated commercially, and recovery of fiber suitable for papermaking has yet to be accomplished. Advanced energy recovery systems such as pyrolysis remain at the demonstration stage. Much still needs to be learned about the environmental and occupational health aspects of resource recovery plant operation. (See chapter 5.)

Studies of the process of technological innovation have shown that from a social point of view private firms tend to underinvest in R&D, especially for technologies that are intended for sale in the disaggregated market made up of local governments. Because knowledge can be used by anyone, once it is obtained, firms cannot usually gain all the returns on an investment in R&D. Thus, one outcome of a market economy is that not all technological opportunities are taken advantage of, nor all technical problems solved, without some level of Government participation.

2. INADEQUATE INFORMATION AT THE LOCAL LEVEL

From State or local points of view, the problems of technical and economic uncertainty are compounded by the complexity of what needs to be known to plan and operate resource recovery systems. Specialized and sophisticated engineering, marketing, legal, and operating skills are all required. State or local governments cannot be expected to have this expertise in-house, or even to be able to interact knowledgeably with consultants, vendors, Government agencies, or special interest groups. Furthermore, local citizens and interest groups generally do not have effective access to expertise about complex technologies such as resource recovery.

The problem of inadequate information is further complicated by the tendency to oversell sophisticated new resource recovery technologies. This can be done both by some of a technology's proponents and by groups that advocate resource recovery as an alternative to legislation which would discourage waste generation such as mandatory beverage container deposits or the product charge. The financial stakes in resource recovery are high—much higher than the cost of plant con-

struction alone. Local officials are in a vulnerable position. On the one hand they are subjected to technology oversell and on the other to opposition by some local trash haulers, to skepticism by some environmentalists, and to resistance to landfills and resource recovery plants by some citizens. An unbiased and objective source of information would be helpful.

Jurisdictional Problems

3. FRAGMENTED AND OVERLAPPING STATE AND LOCAL JURISDICTIONS

Responsibility for solid waste collection and disposal has traditionally been at the local government level, often provided competitively by the private sector or through a franchise system. Except for large cities, however, adequate environmental regulation and effective resource recovery programs often require cooperation among several local government units as well as between State and local governments. For example, in the absence of statewide or regional solid waste environmental control programs, open dumping in unincorporated areas may not be subject to any control.

Furthermore, in the metropolitan areas in which the waste disposal problem is often most serious, it is not uncommon for towns and cities, counties, regional planning councils, and special waste or water management districts to all be involved in some aspect of operating or regulating the collection and disposal of MSW. Frequently, these different jurisdictions are in conflict on many fronts; cooperation to accomplish resource recovery is only one of many problems they face. These conflicts can rarely be resolved by assigning full responsibility to any one group. Consequently, accomplishing resource recovery requires expensive, time-consuming, and complicated planning and coordination.

4. COST SHARING

Perhaps the most difficult local jurisdictional problem is to devise an equitable and effective method for sharing the costs of transportation, transfer, and processing in a centralized resource recovery system that involves several communities. As noted in chapter 6, an economically optimal system for a region would process all of its wastes at the lowest net cost. Some communities, however, may incur higher costs under the regionally optimal system than they would under some alternative. The result is that it may be necessary for those communities whose costs are reduced by resource recovery to appear to be subsidizing those that would otherwise face higher costs, if the region as a whole is to be served at lowest cost.

An example may help clarify the cost-sharing problem. Suppose that two equal-sized communities, A and B, could form a region for the purposes of centralized resource recovery. Suppose further that waste disposal using landfill costs $5 per ton in A and $10 per ton in B, and that a joint resource recovery system costs $7 per ton (net cost). Only B would benefit economically from resource recovery at $7 per ton. Therefore, A, which would not benefit, would probably be disinclined to join in. One approach would be for B to pay an additional $2 per ton to A as an inducement to join the system. Thus, the final net cost to B would be $9 and to A $5 per ton: B would save $1 per ton and A would pay the same as for landfill. Another approach would be for B to pay $2,50 per ton to A. This would result in a net cost of $9.5o per ton to B and of $4.5o per ton to A. With this alternative, both A and B end up with a net savings of $0.50 per ton using resource recovery. The problem with these monetary inducements is that B appears to subsidize A. Even though this is not actually the case, it is likely to be a politically unacceptable solution, particularly if B is an old, crowded city and A is its affluent suburban neighbor.

It is possible that two communities could come to an agreement of the kind discussed above. A real region, however, which can be made up of 100 or more independent communities, will face great difficulties in attempting to devise an acceptable cost-sharing

formula that would enable it to use its optimal (lowest net cost) system. Yet, failure to adopt the lowest cost system may price resource recovery out of the market, (See chapter 6.)

5. MIXTURE OF PRIVATE AND PUBLIC ROLES IN MANAGING MSW

In most communities both public agencies and private firms have operating responsibilities for collecting, processing, and disposal of MSW. Frequently, private firms are given franchises to collect waste, while landfills may be operated by public agencies, sometimes in competition with private firms. Resource recovery plants may operate as private ventures, as public ventures, or as public ventures operated by private firms under contract.

In regions where resource recovery would be economically attractive, different communities may have different mixes of public/private activities, which may greatly complicate agreeing on the arrangements for resource recovery. Existing private operators are often concerned about losing the opportunity to compete for waste business, while existing public agencies resist losing public jobs to private firms. Private landfill operators are wary of competition from a new public or private resource recovery plant, especially if it enjoys a subsidy unavailable to them.

6. RESPONSIBILITY FOR AND OWNERSHIP OF WASTE AFTER DISCARD ("FLOW CONTROL")

Some resource recovery project owners have sought local ordinances or exclusive contracts that would mandate delivery of all of a community's solid waste to a designated resource recovery plant in order to ensure the economic solvency of the plant. For example, in Wisconsin the law authorizes the Wisconsin Recycling Authority to require municipalities to deliver all MSW to its facilities.(l) Such requirements, called "flow control," prohibit licensed private collectors from skimming off the high-value wastes for sale to scrap processors or from seeking the most economic means of disposal, including landfill. Flow control laws are different in intent from ordinances that prohibit unlicensed collectors from scavenging waste placed at the curb for collection.

The purposes of flow control requirements are often to forestall establishing separate collection programs after a plant is built or to eliminate competition by landfills for disposal. Thus, attempts to mandate flow control are usually opposed by private collectors, landfill operators, and private firms as well as by citizens groups who support separate collection programs. (See chapter 4.)

A new separate collection program, if successful, can seriously reduce the revenues of existing resource recovery plants. As shown in chapter 4, however, if a separate collection program is in place or properly planned for, it need not harm centralized resource recovery economically. Likewise, environmentally sound, economically competitive landfill should always be considered in waste management plans. Thus, flow control requirements, which effectively shift risk from the resource recovery plant owner to other private and public parties, appear to serve no public purpose.

In a recent case in Minnesota, a court ruled that such an ordinance requiring use of a particular landfill was an unreasonable exercise of State power since its purpose was to secure the economic health of a particular project rather than to protect health and safety.(2) An ordinance requiring delivery of all wastes to a resource recovery facility in Akron, Ohio, is under court chaIIenge by the National Solid Wastes Management Association.(3)

7. LIMITATIONS ON INTERJURISDICTIONAL WASTE SHIPMENT OR DISPOSAL

Some State and local governments have prohibited transfer of waste into or across their jurisdictions. While such laws have

been oriented toward limiting the use of land in one jurisdiction for disposal of another jurisdiction's wastes, they also serve as a barrier to regionalized resource recovery. New Jersey's law prohibiting importation of waste into the State was upheld by the New Jersey Supreme Court against a challenge that it poses an unconstitutional interference with interstate commerce,(4) but was overturned by the U.S. Supreme Court under a challenge by the City of Philadelphia on the same grounds.(5) The essence of the Court's ruling is that a restriction on waste shipment could be justified to protect public health and safety but that it would be constitutional only if it were applied to wastes from all sources. Application only to out-of-State waste is unconstitutional restraint.

8. OVERLAPPING FEDERAL AGENCY JURISDICTIONS

Concern has been expressed that too many agencies are involved and that the Government fails to speak with a single or coherent voice regarding resource recovery. Federal responsibility for various aspects of MSW management, including resource recovery, is vested in several agencies whose objectives overlap and are sometimes in conflict. These include the Environmental Protection Agency (EPA), the Department of Energy (DOE), the Bureau of Mines (BOM), the National Bureau of Standards (NBS) and other branches of the Department of Commerce (DOC), and the Department of Housing and Urban Development (HUD). Several other Federal agencies have indirect influence over resource recovery, including the Departments of the Treasury and of Defense, the Occupational Safety and Health Administration (OSHA), the Federal Trade Commission (FTC), and the Interstate Commerce Commission (ICC). Advisory or policy roles are also played by the Office of Management and Budget, the Council of Economic Advisors, and the Councils on Environmental Quality and on Wage and Price Stability.

Implementation Problems

9. LIMITED CAPABILITY OF LOCAL GOVERNMENTS TO ISSUE BONDS

Financing capital improvements has become a major problem for many American cities that are at or near their statutory limits on bonded indebtedness or that have poor credit ratings that limit sales. The presence of such communities in a region can be a serious barrier to resource recovery. Furthermore, the Internal Revenue Service (IRS) has been reluctant to certify pollution control revenue bonds for the construction of resource recovery plants. Favorable rulings on such certification could save several percent on the cost of capital for resource recovery.

10. COOPERATION OF LOCAL WASTE COLLECTORS AND HAULERS

Local private waste collectors and haulers tend to view resource recovery skeptically. Many private collectors are also in the landfill business and view resource recovery as a direct competitor. Others fear a squeeze between the sum of higher disposal fees and increased transportation costs to distant resource recovery plants on the one hand, and unwillingness of customers to pay higher rates on the other. Still others are concerned about flow control measures that may accompany resource recovery. (See discussion above on flow control.)

11. CREATION OF LOCAL MONOPOLIES

The private approach to financing, ownership, and operation of resource recovery facilities poses another kind of institutional problem: creation of a local monopoly over solid waste disposal services. The problem is compounded because this monopoly would control an activity that has an essential public health objective. In this event, it may be necessary to consider extending public utility regulation to resource recovery in

order to limit monopolistic behavior in pricing and services.

12. INSUFFICIENT DEFINITION OF HEALTH, SAFETY, AND ENVIRONMENTAL STANDARDS FOR RESOURCE RECOVERY PLANTS

Currently, the status of resource recovery plants as generators of air, water, and noise pollution; bacterial and viral disease vectors; and safety hazards to workers and the community is unclear, (See chapter 5.) Recent experiments suggest that air pollution from some systems may be significant unless controlled carefully. Disease problems, if any, are not well understood. From the institutional perspective, however, the most significant point is that health and environmental performance standards for resource recovery facilities of various types and sizes have not yet been established. The absence of air quality standards for heavy metals and pathogens, for example, combined with the possibility that such emissions from resource recovery may be regulated in the future, is a source of economic uncertainty for potential investors in such systems. Presumably OSHA'S General Duty Clause(6) provides a basis for maintaining a healthy environment in such plants, but it also leaves room for uncertainty about the appropriate levels of control. Until all the relevant standards are defined, investment in resource recovery will be unduly uncertain.

13. SITING FACILITIES

Attitudes toward resource recovery vary considerably among environmentalists, conservationists, and other interested citizens. Some view resource recovery skeptically as a high-technology approach to waste disposal that would foreclose opportunities to reduce waste, to conserve materials, or to adopt source separation programs. Others view it as an environmentally sound solution to the waste disposal problem. Still others, perhaps most, have come to view resource recovery as one option among several that may play a role in a well-designed program.

Nevertheless, citizens rarely want to have such a plant in their neighborhood. Thus, siting facilities such as transfer stations, primary and secondary processing plants, and residue disposal landfills pose problems for resource recovery systems. A project in St. Louis foundered, in part, on its inability to site one of four proposed transfer stations. Resource recovery plants are industrial complexes that require utiIities; access by truck and, in some cases, rail; parking and storage space; and space for landfill of residuals or of wastes in the event of an emergency shutdown. They are restricted to industrially zoned parcels and must meet various environmental requirements. Often this includes an environmental impact statement. Even in the absence of substantive legal barriers to the selection of a site, objectors may be able to delay or stop site selection or facility construction by litigating over the procedures used.

In multicommunity projects, siting is further complicated by the conflict between the wishes of some interests to attract resource recovery to their area as a tax-paying industrial development and of others to avoid establishment of a project nearby that would bring in waste from distant communities. Problems of this type have emerged with a variety of public projects in which the costs are incurred at the local level but the benefits are regional.(7)

Marketing Problems

Marketing recovered materials and energy requires that customers be found for them at satisfactory prices. Nevertheless, various institutional barriers may make recovered products less marketable than would be the case if only price mattered, Two of the problems listed in table 49; inadequate or nonexisting standards of performance for recovered products (table 49, No. 14); and high

freight rates for shipping MSW and recovered materials (table 49, No. 17) are discussed in chapter 3, to which the reader is referred for details. Two other marketing problems are discussed here.

15. LIMITED AUTHORITY OF LOCAL GOVeRNMENTS TO ENTER INTO LONG TERM SALES CONTRACTS

Communities in some States are forbidden to enter into long-term contracts for the sale of waste or for the disposition of products from resource recovery plants. For example, contracting authority may be limited to 1 year or to the term of the city council or the mayor. Economically sound resource recovery plants require much longer contracts, often for 10 years or more. If the limits on contracting authority were removed, the interests of a community could be preserved by providing for floor prices, escalation clauses, profit-sharing, or renegotiation options. Such limits imposed by State law or city charter are major barriers to resource recovery.

16. ELECTRIC UTILITY RATE REGULATION THAT DISCOURAGES USE OF NEW FUEL SOURCES

Traditionally, electric rates are set to permit a reasonable rate of return on invested capital. As operating costs change, especially upward, the delay between increased costs and the approval of rate increases can reduce the effective rate of return below that allowable. This "regulatory lag" can cause utilities to avoid taking risks that might result in unanticipated costs. Furthermore, in recent years many States have granted fuel adjustment clauses, which permit automatic rate increases whenever utility fuel costs increase. This has weakened the incentive for utilities to seek lower cost fuels. In addition, many utilities are faced with a shortage of capital caused by the higher costs of new generating equipment coupled with inadequate financial performance. Thus, they are reluctant to enter into any program thr would put the productivity of existing equipment at risk. Finally, the fact that utilities are required by law to provide reliable service also makes them less willing to try new approaches.

All of these utility rate considerations have combined to make utilities, one of the prime potential markets for recovered energy, very hesitant to use refuse-derived fuel (RDF) or other solid waste fuel forms. Even if RDF combustion technology were well understood, some of these factors would continue to operate to the disadvantage of resource recovery. This assessment of the situation is similar to that of a DOE contractor(8) and of an Electric Power Research Institute conference.(9)

Federal Options for the Institutional Problems

Three overall considerations should guide Federal action to solve institutional problems in resource recovery. First, Federal programs should recognize that there are wide differences in local conditions across the Nation. Therefore a wide range of local responses and arrangements should be accommodated,

Second, Federal programs should recognize that centralized resource recovery is only one of a variety of legitimate approaches to management of MSW, and that such programs should not be designed to promote one approach to the exclusion of others. The paramount concern should remain protection of public health and safety through cost-effective waste disposal.

Third, the nature of Federal programs to overcome institutional barriers should change as centralized resource recovery matures from an experimental to a fully developed technology. As local government experience with resource recovery accumulates, the need for a Federal presence will decline.

The Federal Government has only limited authority to directly address most of the institutional problems discussed above. In some

cases it can offer inducements to do so to the State and local governments, which do have the necessary authority. In other cases, it can offer direct financial assistance to help reduce the uncertainties and risks that underlie some of the issues. In a few instances, the Federal Government can act directly to remove institutional barriers.

Since the Federal Government does not have a role in the implementation of resource recovery per se, its impact can be felt principally through Federal inducements to State and local governments. The Resource Conservation and Recovery Act of 1976 (RCRA) reflects this approach, coupled with a program to close open dumps and regulate landfills, again through inducements to States to act.

Table 50 lists three categories of policy options available to the Federal Government for helping overcome institutional barriers to centralized resource recovery. Some of these policy options have been discussed in other chapters as ways to overcome technical and economic uncertainties or to deal with limitations on resource recovery; here they are discussed only in connection with institutional barriers.

Table 50.—Available Federal Options Applicable to Institutional Problems in Centralized Resource Recovery

Direct Federal Actions to Remove Barriers
- Fund research, development, and demonstration projects.
- Education and training.
- Technical assistance to State and local governments.
- Coordinate or consolidate Federal programs.
- Certify resource recovery plants as eligible for pollution control revenue bond financing.
- Promulgate health and environmental standards for resource recovery plants.
- Assist in, or mandate, development of performance standards for recovered materials and energy.
- Require utility rate regulation favorable to use of energy from waste.
- Adjust railroad freight rates for recovered resources.

Federal Financial Assistance to Reduce Uncertainty and Risk
- Construction subsidies: e.g., grants, tax credits, low-interest loans, loan guarantees.
- Operating subsidies: e.g., recycling allowance, product subsidy, tax credit for wages paid.

Federal Inducements to States and Local Governments (Federal funds for statewide solid waste planning contingent on various State actions)
- Regionalization of planning.
- Citizen participation in planning.
- Adoption of siting procedures.
- Change utility regulation.
- Elimination of barriers to long-term contracts.
- Prohibit waste shipment barriers.
- Mandate cost-sharing formulas.
- Eminent domain for resource recovery facilities.
- Regulate prices and conditions of service for recovery monopolies.

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Effectiveness of the Federal Policy Options

Table 51 shows the primary relationships among the policy options and problems. Note that several options may be used to address one problem, and that some address several problems simultaneously. Table 51 also references the parts of RCRA in which various options appear. The following paragraphs explain the roles of the various options.

Direct Federal Actions

FUND RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROJECTS

Federal R&D funds primarily serve to fill gaps in private funding. They help to reduce technical uncertainty and thus may reduce economic risk. Demonstration project funds may also reduce technical uncertainty and economic risk, and in addition may help show State and local people that resource recovery can work, if it does.

There is currently, however, a significant amount of privately funded R&D in new resource recovery processes, as well as several privately funded demonstration and commercial plants. Furthermore, much of the research that needs to be done in commercializing resource recovery requires a kind of "learning by doing. " This is best accomplished by building and operating a series of similar facilities, rather than by R&D programs. These observations both suggest that

Table 51 .— Relationship of Federal Options to Reducing Institutional Barriers to Centralized Resource Recovery

Problem area	RCRA reference	Direct Federal action								Federal action to reduce uncertainty and risk		Federal inducements to State and local governments							
	Policy options	Research, development, & demo. funds	Education & training	Technical assistance	Federal coordination	Revenue bond certification	Promulgate env. health safety standards	Set performance standards	Utility rate reform	Freight rate reform	Construction subsidies	Operating subsidies	Regional planning	Citizen participation	Siting procedures	Utility rate reform	Allow long-term contracts	Prohibit flow control	Mandate cost-sharing	Eminent domain	Regulate resource recovery monopoly
		4008, 8001, 8004, 8006	7007	2003, 2006, 4008	6003, 6004			5002					4006, 4008	7004			4003				
1. Underinvestment in R&D																					
2. Inadequate information																					
3. Fragmented State and local jurisdictions																					
4. Cost-sharing																					
5. Private/public mix																					
6. Flow control																					
7. Limits on waste shipment																					
8. Overlapping Federal jurisdictions																					
9. Limited bonding capability																					
10. Cooperation of collectors/haulers																					
11. Resource recovery monopoly																					
12. Insufficient health & environmental regulation																					
13. Facility siting																					
14. Inadequate performance standards																					
15. Limits on long-term contracts																					
16. Risk avoidance by utilities																					
17. High freight rates																					

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the Federal role in R&D might be limited to fundamental investigations into the underlying science and technology of mechanical separations and size reduction, to measurement of properties of recovered materials and fuels, and to R&D on health, safety, and environmental problems. (See chapters 4 and 5 for discussion of R&D needs and activities in resource recovery.)

Under the Resource Conservation and Recovery Act (RCRA), EPA, DOE, and DOC are given responsibilities for research, development, and demonstration in resource recovery. EPA and DOE have requested and received appropriations for this activity. Funds authorized by RCRA have not been appropriated to support the research on the properties of recovered materials and energy at NBS. In addition to these activities under RCRA, the Bureau of Mines in the Department of the Interior has done research on resource recovery under the authority of its organic act.

EDUCATION AND TRAINING

Education and training in resource recovery should have positive impacts, whether directed at technical and operating professionals and workers, citizens, competitors, or potential objectors. Not only will decisions be more well-informed, and therefore improved; but cooperation of waste collectors and haulers, citizens, environmentalists, and neighbors of facilities will also be improved. Better understanding should help avoid construction delays and technical oversell. Cost-sharing arrangements can be worked out more easily if decisionmakers understand the benefits to be gained.

Under section 7007(c) of RCRA, EPA is to make an investigation of employment needs, opportunities, and barriers in solid waste disposal and resource recovery. This survey could help determine part of the national need for specialized training programs in resource recovery.

TECHNICAL ASSISTANCE TO STATE AND LOCAL GOVERNMENTS

One approach to dealing with the problem of inadequate information and understanding of resource recovery at the State and local levels is for the Federal Government to provide direct technical assistance, especially through knowledgeable people. RCRA section 5004 provides for DOC " . . . to evaluate the commercial feasibility of resource recovery facilities . . . and to develop a data base for purposes of assisting persons in choosing such a system. "

RCRA section 2003 provides for EPA to establish Resource Conservation and Recovery Panels. " . . . The Administrator shall provide teams of personnel, including Federal, State, and local employees or contractors (hereinafter referred to as Resource Conservation and Recovery Panels) to provide States and local governments upon request with technical assistance on solid waste management, resource recovery, and resource conservation. Such teams shall include technical, marketing, financial, and institutional specialists, and the services of such teams shall be provided without charge to States or local government. " EPA has recently published a handbook to guide the implementation of this program.

The provision of technical assistance is based on the beliefs that State and local governments are not well enough informed to make sound decisions about resource recovery and that they lack the necessary personnel to do so. Recent research on technological innovation in the public sector (in areas other than resource recovery) suggests that public officials and staff are often well informed about the existence of new technology but that they lack credible sources of evaluated information.(11) If this is true in the resource recovery area, the Resource Conservation and Recovery Panels can have a major impact on the future adoption of resource recovery if they remain scrupulously objective and responsive to State and local

concerns. In particular, they must avoid bias toward or against various approaches and technologies. At the same time, it is important that they not compete with private parties willing and able to provide the same assistance.

Technical assistance might help to improve the general information base and thus aid State and local governments to make sounder decisions about resource recovery systems. In addition, State and local governments might be helped to understand the importance of resolving related problems at the local level, including supervision of waste disposal monopolies, ensuring local collector/hauler cooperation, lowering barriers to shipment of waste across boundaries, overcoming citizen opposition and multi jurisdictional conflicts, and avoiding construction delays.

REQUIRE FEDERAL AGENCY COORDINATION OR CONSOLIDATION FOR RESOURCE RECOVERY

The problem of interagency coordination for resource recovery has been a major concern of Federal agencies. However, diverse Federal responsibilities for resource recovery appear to contribute to healthy competition. If a single agency had full responsibility at the Federal level, an orthodox view of resource recovery might develop. Currently, the perspectives of EPA, DOE, DOC, and other agencies appear to be different. Thus, they encourage critical review of each other's policies and programs.

Under RCRA, responsibility for Federal interaction with State and local governments is centered in EPA. Therefore, individual State and local governments should be able to locate the most appropriate Federal agency to meet their needs through EPA, while a wider access to the Federal Government for various interests is preserved at the national level by the involvement of several Federal agencies.

EPA and DOE are expected to complete a memorandum of understanding regarding their respective roles in planning, demonstrations, and financial assistance for commercializing the recovery of energy and materials from solid waste.(12)

MAKE RESOURCE RECOVERY PLANTS ELIGIBLE FOR POLLUTION CONTROL BOND FINANCING

If IRS were to allow resource recovery facilities to be financed by industrial development bonds, it would help to overcome both the bonded indebtedness limits of cities and the capital shortage faced by electric utilities. Section 103(b)(4)(E) of the Internal Revenue Code provides for an exemption from Federal income taxation for gross income from industrial development bonds issued by States, territories, possessions or any of their subdivisions, or by the District of Columbia for the purpose of financing "solid waste disposal facilities." Apparently, IRS is reluctant to certify resource recovery plants for financing with tax free bonds under this provision since such plants recover valuable products including fuels and materials. An act of Congress may be needed to clarify the status of resource recovery for purposes of section 103.

PROMULGATE REGULATIONS FOR ENVIRONMENTAL, HEALTH, AND SAFETY PERFORMANCE OF RESOURCE RECOVERY FACILITIES

The absence of clear regulatory standards of performance for resource recovery plants may serve to deter both private and public investment in them, since subsequent modification of existing plants to meet new standards may be costly. Therefore, the Federal agencies involved should carry out the necessary research and monitoring. The results should then be used to promulgate the standards needed for occupational health and safety, air quality, and water quality.

In addition, the status of resource recovery plants under existing air quality regulations is not clear, especially at the State level. In some jurisdictions, some types of small incinerators are effectively banned under State air quality regulations. This is the case in

parts of Maryland, for example. Recently, EPA has exempted new recovery facilities from its emission offset policy under the Clean Air Act.(14) This action removes one barrier to their construction in nonattainment areas. *

Setting such standards might help to remove the barriers to shipments of waste for resource recovery across jurisdictional boundaries by providing assurance to communities that their environments would be protected. Citizen acceptance of facilities might be eased, siting limitations lowered, and construction delays averted, if well-enforced, broadly accepted standards were established. Waiver of such standards for resource recovery plants may prove to be counterproductive if it acts to stimulate opposition to new facilities. However, temporary variances for environmental emissions on a case-by-case basis may prove useful to assist in easing the new technologies through the uncertain period of early commercialization.

ASSIST OR MANDATE THE DEVELOPMENT OF PRODUCT PERFORMANCE STANDARDS

If activities in the private sector to develop performance standards for recovered materials and energy were inadequate, the Government might consider promulgation of such standards directly. However, as noted in chapter 3, the development of standards is progressing, and direct Federal involvement is probably unnecessary.

Under section 5002 of RCRA, NBS is to publish guidelines for the development of specifications for recovered materials. DOC is to cooperate with national standards-setting organizations as necessary to encourage the publication, promulgation, and updating of standards for recovered materials.

REQUIRE UTILITY RATE REFORM

Current electric rate regulation provides no incentive to utilities to use energy from waste. The Federal Government could offer direct financial incentives to utilities for this purpose based on, for example, a cash payment for every unit of recovered energy used. Alternatively, the Federal Government could intervene directly in the traditional State province of rate regulation and require States to remove such disincentives as the fuel adjustment clause or to offer such incentives as a higher allowable rate of return on capital required to use energy from waste. (Inducements to the States to do the same thing are discussed below.)

FREIGHT RATE ADJUSTMENT

Adjustment of freight rates for recovered resources is designed to improve their marketability and thus stimulate implementation of resource recovery. However, as the investigations reported in chapter 3 have shown, the potential of reasonable freight rate adjustment to improve markets for scrap is limited, at least in the short run. Thus, this policy cannot be viewed as a major factor in overcoming barriers to resource recovery.

Federal Financial Assistance to Reduce Risk and Uncertainty

OVERVIEW OF SUBSIDIES FOR STATIC AND DYNAMIC PURPOSES

The approach of one class of options is for the Federal Government to offer direct financial assistance to public or private investors in resource recovery in order to reduce the uncertainties and risks they face. These options involve various subsidies of the costs of constructing or operating a resource recovery facility.

There is a subtle but important distinction between: i) a subsidy designed to make a project economically feasible that would otherwise surely not be, and ii) a subsidy designed to reduce the economic risk associated with investing in an uncertain project. In the first case, the technical and economic performances of a proposed project are well known, the costs exceed the benefits, and a subsidy

*Under the Clean Air Act, a nonattainment area is one that is not in compliance with the National Ambient Air Quality Standards.

simply makes it possible to go ahead despite the unfavorable economics. In the second case the technical performance, the costs, or the revenues are not predictable with certainty, although there is reason to expect that the project has a good chance of being successful. In this case, a subsidy can be designed to reduce the potential loss to an investor who takes the risk caused by the uncertainty.

Both kinds of subsidy may be appropriate Federal Government actions depending on the circumstances. For example, subsidizing a project known to be uneconomic may be desirable if significant costs or benefits might accrue to the public that are not reflected on the project balance sheet. This is the case for example with the Federal subsidy of the operating budgets of existing urban mass transit systems. On the other hand, the subsidy of an uncertain project is more likely to occur when a new technology is being tried, which, if successful, could be economically self-supporting, but which, if unsuccessful, could leave the investor facing such a considerable loss that no private investor would be willing to take the risk. This argument was used to justify proposals for American, and later British and French, Government subsidies for the development of the supersonic transport.

Arguments for subsidy of uncertain or risky projects can easily be overstated. Often, the fact that a private investor willing to take the risk cannot be found is a signal that the investment community has judged a project unlikely to succeed. The major exceptions to this rule are: i) cases when government rules or other circumstances prohibit effective risk pooling (say, prohibitions on certain kinds of joint ventures) or set limits on allowable rates of return from risky investments; ii) cases when even if the project were successful and the risk were reduced to zero, it would still justify continuing subsidy in the public interest; and iii) cases when expenditures to reduce technical uncertainty, if successful, produce new knowledge that risk-taking investors cannot effectively capitalize on, i.e., when successful investors might significantly subsidize their own potential competitors. This last case is essentially a restatement of the rationale presented earlier for governmental support of R&D, but extended to recognize that such support is not the only tactic available to the Government to support technological development.

Resource recovery technologies currently fit, to varying degrees, the criteria set forth above, which would justify Federal subsidy for risky projects. First, individual communities, as investors in resource recovery, are unlikely to be able to pool their efforts to invest in risky new technology. Second, communities that might pay private firms for resource recovery are unlikely to consider paying the price for the risk premiums those firms would require in order to justify investing in a risky new technology. Third, some general subsidy of resource recovery may be justified on the grounds of public benefit even when risks are small. Finally, risk-taking communities or private investors, if successful, are likely to find themselves subsidizing both risk-avoiding communities and those firms that would prefer to wait for someone else to take the initial risks. If all parties view the situation this way, no one is likely to undertake the risk.

It is appropriate, then, to consider two kinds of subsidy programs designed to reduce the economic risk of investing in an uncertain resource recovery project: construction and operating subsidies. (Subsidy to enhance the attractiveness of uneconomic but certain investments was analyzed in chapter 6.)

CONSTRUCTION SUBSIDIES

Construction subsidies might be offered as tax credits, cash grants, low-interest loans, or loan guarantees. Each form is appropriate to different circumstances. Construction subsidies would accelerate implementation of resource recovery by communities and/or firms. Increased resource recovery activity should reduce the uncertainty about the technical and economic performance of such plants as experience is gained in building and oper-

ating them. This is not to say that such plants will necessarily be proven technically and economically workable, but only that the uncertainty would be reduced.

The availability of construction subsidies should help local communities overcome some of their jurisdictional conflicts and cooperate on cost sharing in order to qualify for the subsidies. At the same time, these subsidies can distort the tradeoffs among various approaches. For example, their availability would tend to make smaller plants more attractive and thus would enable communities to avoid such conflicts by going it alone. Local citizens might be more inclined to accept resource recovery if the Federal Government were paying part of the cost. This might help avoid litigation-related construction delays. Subsidies would help communities afford plants otherwise out of reach due to debt limits.

Tax credits are of no use to public owners who pay no taxes and are of little interest to resource recovery firms unless they have taxable income from other areas of business as well. Thus, tax credits favor established, diversified firms. Loan guarantees require no immediate expenditure of public funds, and if a project is successful may involve no outlays at all. However, loan guarantees are designed to spread economic and technical risk by insuring the financial backers of a project against its failure and subsequent default. Thus, one undesirable effect of loan guarantees is to reduce the discipline imposed by the financial community and, in a sense, to insure the resource recovery plant builder against his own mistakes.

Low-interest loans are more effective in offsetting market uncertainty than technical uncertainty. If a project fails to work technically, the holder of a low-interest loan still has to pay off his loan, albeit at a somewhat lower cost, with the risk of having no revenues at all with which to pay. Cash grants are more effective in addressing technical uncertainty than are low-interest loans, since the investor/operator faces a lesser risk if he has to pay off a smaller principal in the event that the project is a technical failure and produces no revenues. Beyond these technical considerations, the selection of a subsidy mode is often a political choice as well as an analytic matter.

OPERATING SUBSIDIES

Operating subsidies can include the recycling allowance (see chapter 8), the product subsidy, and tax credits for wages paid. They would have some of the same impacts as construction subsidies. They are, however, probably a weaker inducement to implement resource recovery because they do not overcome the municipal indebtedness barrier and because their impact is felt in the future rather than as a present reduction in initial investment. If operating subsidies are pegged to revenues, a plant operator will find them less certain than construction grants or low-interest loans. However, as a supplement to revenues when scrap prices are low, they could be a partial substitute for the long-term contracts that otherwise would be required to ensure the economic viability of a project. A tax credit for wages paid new employees hired to do recycling work would tend to stimulate the hiring of resource-recovery workers by the private sector, and would tend to favor labor-intensive approaches (small-scale incinerators, source separation) over capital-intensive large-scale resource recovery.

The Federal Government might attempt to reduce the economic uncertainty around resource recovery by operating a stockpile for various recovered resources in order to stabilize their prices. This option would not be applicable to paper or RDF, which have limited storage life. Such an option maybe attractive in view of the great fluctuations in price and demand for scrap noted in chapter 3. Like all counter-cyclical economic stockpiles this one would face heavy political pressure. Resistance would be offered by scrap dealers to sales from the stockpile in periods of high prices and resistance to purchases for the stockpile would be offered by scrap users in periods of low prices. (See

chapter 3 for additional discussion of stockpiles for recovered resources.)

Federal Inducements to State and Local Governments

The previous sections have presented a number of direct Federal alternatives for addressing institutional problems in resource recovery. A number of other approaches can be taken indirectly by requiring State and local governments to take various steps in order to be eligible for federally funded assistance programs.

Several direct policies might serve as vehicles for the conditional implementation of indirect policies. These include subsidies, education and training programs, technical assistance, and planning grants. In each case the approach is the same: State and local participation in a direct Federal program is conditioned on implementation of certain policies at the State and local level. Failure to do so renders the jurisdiction ineligible for Federal funds.

Available conditional programs are related to the various institutional problems listed in table 51. On the whole, each of these indirect or conditional programs implemented at the State or local level affects a larger number of institutional problems than do the direct Federal options. This is because the main arenas for creating and resolving institutional problems in resource recovery are State and local governments.

It should be noted that none of the conditional policies is likely to reduce the technical or economic uncertainty of resource recovery. Rather, such policies act largely to remove specific institutional impediments to them. Even if all the local obstructions were to be removed, resource recovery might still not be economic or technically feasible in some areas.

Planning grants for State and local solid waste management provide the most convenient inducement to State and local governments to overcome the difficulties posed by multi jurisdictional organization for resource recovery. If administered through the States to local governments, such Federal funds can provide a double incentive for action beyond direct Federal control.

At the local/regional level, planning grants can work in two ways. First, most of the Nation today is served by multi jurisdictional regional planning agencies required by a host of Federal programs such as the OMB A-95 review procedure or the HUD "701" planning grant program. These agencies, which are often on the lookout for sources of funds, provide a potential constituency for participation in federally funded planning programs. Second, in the absence of regional agency involvement, the availability of planning funds may stimulate one community to become the advocate for multi jurisdictional planning; a course that might otherwise have been unaffordable.

RCRA strongly emphasizes regional planning in State-designated regions as a means to encourage resource recovery implementation. As noted in table 51, this approach is directed at overcoming a number of problems, including jurisdictional overlap and fragmentation, cost-sharing among communities, mixed private and public responsibilities for waste management, and facility siting problems. Each of these problems is exacerbated under the large-scale, regionalized approach to centralized resource recovery.

However, as discussed in chapter 5, in the last few years emphasis on the regionalized approach has declined as interest has grown in small-scale resource recovery systems featuring heat recovery. Thus, the need has also decreased for a regionalized planning and management approach to overcome the institutional barriers to regional systems. Furthermore, it now appears just as reasonable to select such regions on administrative and political/jurisdictional bases as on the basis of optimum technical and economic design of large-scale systems.

Findings on Overcoming Institutional Barriers to Resource Recovery

Institutions play key roles in the develop- I ment and implementation of resource recovery. They are especially important in establishing or removing barriers to the emergence of centralized resource recovery as a new, uncertain and, therefore, risky technology for disposing of MSW. Many such institutional barriers are permanent features of society, so ways must be found to offset, rather than to remove them.

This chapter has discussed 17 types of institutional problems, in four classes, and has suggested three kinds of approaches to their solution.

The four classes of problems are: information problems, jurisdictional problems, implementation problems, and marketing problems. In general, three broad approaches are available to the Federal Government to address them: direct Federal action, Federal incentives to reduce risk and uncertainty, and Federal inducements to State and local governments. OTA has not attempted to rank the seriousness of these problems or the relative effectiveness of various approaches to their solution. All of the problems are important, and a mix of approaches is required to resolve enough of them to give resource recovery an opportunity to progress.

Each party to a resource recovery effort quite naturally tries to minimize the risks he faces, yet such risk avoidance has a price for all the parties involved. Finding ways to share the risks that derive from the technical and economic uncertainties of resource recovery is a major source of its institutional problems. Carefully designed Federal subsidy programs, among other approaches, can help overcome the risk barrier confronted by private entrepreneurs or public agencies in introducing new resource recovery technologies. Such a use of subsidies is conceptually different from their use to make projects appear economically feasible when they otherwise would not be. The first use of subsidy for resource recovery is clearly justified, the second less so.

A basic strategy of RCRA is to induce States to institute regionalized planning for solid waste management. This approach makes sense if large-scale regionalized resource recovery offers great economic advantages through economies of scale in processing wastes and selling recovered energy. In view of both recent trends toward small-scale systems and of the difficulty of marketing large amounts of recovered energy, especially to electric utilities, the importance of regional planning for disposal of ordinary MSW has lessened.

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