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A LEGISLATIVE PROPOSAL FOR IMPROVING MATERIALS POLICYMAKING: IMPACTS AND ISSUES*

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I. INTRODUCTION

The OPEC embargo of 1973 and subsequent increases in the price of oil¹ reminded the United States of its dependence on natural materials, many of which it imports.² The nation's vulnerability to an embargo of foreign oil resulted in part from the rapid exhaustion of domestic resources while cheap and plentiful foreign oil was largely

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1. See A. SAMPSON, *THE SEVEN SISTERS* 249-61 (1975).

2. See, e.g., *Meeting America's Resource Needs: Problems and Policies: Hearings Before the Ad Hoc Comm. on the Domestic and International Monetary Effect of Energy and Other Natural Resources Pricing of the House Comm. on Banking and Currency*, 93d Cong., 2d Sess. (1974) [hereinafter cited as *Resource Hearings*].

barred by an import-quota system.³ National policy was based on estimates of domestic oil and gas supplies that proved to be greatly inflated.⁴ The United States therefore failed to establish mutually acceptable long-term relations with petroleum exporters thus making itself vulnerable to hostile action.⁵

Since 1973 the federal government has availed itself of more accurate sources of information about oil and natural gas,⁶ and earlier inflated estimates of our ultimately recoverable resources have been reduced.⁷ The Federal Energy Administration collects data formerly available only from an industry trade association,⁸ and a number of other federal agencies compile data on other natural resources.⁹ Although much data is now available, members of Congress and others in and out of government continue to express concern that the United States may still be basing its policies on inadequate data and analysis, and therefore may be struck unprepared by new supply crises in aluminum, copper, manganese, fertilizer, or lumber.¹⁰ In the words of former Senator John V. Tunney (Democrat, California),

3. See J. BLAIR, *THE CONTROL OF OIL* 3-23 (1976); cf. M. ADELMAN, *THE WORLD PETROLEUM MARKET* 150-94, 242 (1972) (restrictions on imports to United States had effect of supporting world oil prices in face of increasing world supplies, declining costs).

4. See J. BLAIR, *supra* note 3, at 4-15.

5. *Id.* at 3-23. The continuing failure of Congress to enact systematic energy legislation is discussed in Brannon, *Prices and Incomes: The Dilemma of Energy Policy*, 13 HARV. J. LEGIS. 445 (1976); Morrison, *Energy Tax Legislation: The Failure of the 93d Congress*, 12 HARV. J. LEGIS. 369 (1975).

6. See, e.g., FEDERAL ENERGY ADMINISTRATION, *MONTHLY PETROLEUM STATISTICS REP.*

7. See UNITED STATES GEOLOGICAL SURVEY, *GEOLOGICAL ESTIMATES OF UNDISCOVERED RECOVERABLE OIL AND GAS RESOURCES IN THE UNITED STATES* 1, 46 (1975) (estimate of 82 billion barrels of oil remaining undiscovered, compared with 103 billion already produced; earlier estimates had ranged up to 500 billion barrels); J. BLAIR, *supra* note 3, at 11.

8. American Petroleum Institute publications were the principal source of statistics on petroleum movements; *Platt's Oilgram*, a private newsletter, also compiled data from private companies.

9. These agencies include the Bureau of Mines and the United States Geological Survey of the Department of the Interior, the Department of Agriculture, the Energy Research and Development Administration, the Federal Energy Administration, and the Department of Commerce, among others.

10. See generally, e.g., GENERAL ACCOUNTING OFFICE, *U.S. ACTIONS NEEDED TO COPE WITH COMMODITY SHORTAGES* (1974); NATIONAL COMMISSION ON MATERIALS POLICY, *MATERIAL NEEDS AND THE ENVIRONMENT TODAY AND TOMORROW*, FINAL RE-

Although there are differences in our approaches, it is clear that there is a consensus among us that the present Government monitoring systems must be drastically reformed. We can no longer afford to have a system where there is no focal point of responsibility and which is incapable of presenting to the administration or the Congress adequate information in order for priorities and alternative actions to be developed in the commodities and materials area.¹¹

The materials data, forecasting, and analysis system is very important to the future materials policies of this country. Adequate, timely, and reliable data, forecasts, and analyses are not sufficient for effective policy to solve complicated national materials problems, but they are necessary for improving the public policymaking process. Alternative means to alleviate scarcity involve complex trade-offs among legal, political, economic, and social variables. Without improved data, analysis, and forecasting, this nation's policymakers will be unable to make these trade-offs effectively.¹²

Materials data are now scattered among dozens of federal agencies in varied and often incompatible forms, and are subject to highly variable forms of analysis, or none at all. Data may be available freely to other agencies and to the public, or held under the tightest restraints.¹³ The fragmentation of materials information is a remnant of an earlier time, when oil and lumber were rarely considered in the same context and could be relegated safely to distant agencies of government. With today's technology, oil, natural gas, glass, metal, and

PORT TO CONGRESS (1973); OFFICE OF TECHNOLOGY ASSESSMENT, AN ASSESSMENT OF INFORMATION SYSTEMS CAPABILITIES REQUIRED TO SUPPORT U.S. MATERIALS POLICY DECISIONS (1976); *Domestic Supply Information Act: Joint Hearings on S. 2966 & S. 3209 Before the Senate Comms. on Commerce and Government Operations*, 93d Cong., 2d Sess. (1974) [hereinafter cited as *Domestic Supply Information Act*]. Concern is also reflected in the large number of bills introduced. In 1975 alone the following measures to improve the federal government's materials information system were introduced: S. 1864, 94th Cong., 1st Sess. (1975); S. 1415, 94th Cong., 1st Sess. (1975); S. 1410, 94th Cong., 1st Sess. (1975); S. 552, 94th Cong., 1st Sess. (1975); H.R. 9598, 94th Cong., 1st Sess. (1975); H.R. 2385, 94th Cong., 1st Sess. (1975); H.R. 1847, 94th Cong., 1st Sess. (1975); H.R. 968, 94th Cong., 1st Sess. (1975). See also S. 27, 94th Cong., 1st Sess. (1975); H.R. 2363, 94th Cong., 1st Sess. (1975); H.R. 1668, 94th Cong., 1st Sess. (1975); H.R. 1332, 94th Cong., 1st Sess. (1975); H.R. 659, 94th Cong., 1st Sess. (1975).

11. *Domestic Supply Information Act*, *supra* note 10, at 90.

12. See generally sources cited note 10 *supra*.

13. Forty principal sources of materials information in the federal government are given as examples of the present system in OFFICE OF TECHNOLOGY ASSESSMENT, *supra* note 10, at 32; barriers to exchange of information are discussed in *id.* at 48-58, 110.

wood may be interchangeable raw materials in construction; increased use of plastics in manufacturing reduces our need for imported manganese for steel production; expanded use of aluminum in auto manufacturing reduces gasoline consumption but enlarges our dependence on bauxite imports and the demand for uranium and coal to produce electric power.¹⁴ Such examples could easily be multiplied. They all point to the need for a mechanism by which all relevant information can be collected, so that a coherent overall materials policy can be determined.

A number of congressional and executive reports have recently considered the need for a new governmental mechanism to deal with materials data and policy issues.¹⁵ Under a contract from Congress' Office of Technology Assessment, the present authors reviewed the existing repositories of materials information and the possibilities for improvement.¹⁶ We interviewed policymakers in government, private industry, and nonprofit organizations.¹⁷ A summary of this general overview has been published separately.¹⁸ In this article we describe our principal recommendation resulting from that research, a proposal for a new Bureau of Materials Statistics and Forecasting, and analyze its probable effects on government, free enterprise, and the general public.¹⁹

14. See generally H. LANDSBERG, H. FISCHMAN & J. FISHER, *RESOURCES IN AMERICA'S FUTURE, PATTERNS OF REQUIREMENTS AND AVAILABILITIES 1960-2000* (1963).

15. See note 10 *supra*.

16. See Wood, Lamb & Larsen, *Improving Public Policymaking in an Age of Materials Scarcity: A Legislative Proposal*, 62 *IOWA L. REV.* 381 (1976).

17. We received 54 interviews or questionnaire responses from government officials, 46 from the private sector, and 15 from not-for-profit organizations. The authors promised anonymity to the respondents, who therefore are not quoted directly here. See Wood, Lamb & Larsen, *supra* note 16, at 385 n.23. Many of the views of respondents concerning a new or improved materials information system are summarized in tabular form in *OFFICE OF TECHNOLOGY ASSESSMENT, supra* note 10, at 58-71.

18. See Wood, Lamb & Larsen, *supra* note 16.

19. We do not discuss international impacts and issues. We assessed such considerations, but in our opinion they generally do not rank in importance with the impacts and issues discussed within the text. A few international impacts may be significant. For example, the new agency we propose may have some effect on the formation and operation of international materials cartels. If the United States is better able to perform statistical analysis and forecasting, and to gather and validate information, it can develop strategies and contingency plans for coping with cartels and boycotts. A domestic agency like the one we propose will make it clear that government and industry require international materials information, and the proposed agency's clearinghouse function will allow industry as well as policymakers to obtain information about many countries from one source. An improved materials information system is likely to have little impact on the operations of the multinational corporations, or be of little benefit

II. THE PROPOSAL

The term "materials" includes fuels, metals, minerals, organic substances (wood and fiber), fabricated materials, and waste or recycled materials.²⁰ (Foodstuffs, traditionally subject to different policy considerations, are not included.) Data concerning the entire life cycle of materials in use are, of course, pertinent to materials policy. The extent of domestic resources, availability of imports, demand from different sectors of the economy, disposition of wastes, availability of substitutes, and degree of recycling are all interdependent factors affecting policy, and it is correspondingly important to obtain a clear view of every material's complete life cycle.

We do not propose to increase significantly the federal government's power to collect information from private sources. Reporting requirements are already extensive and sometimes burdensome, and the federal government is as much in danger of paralysis from information overload as it is threatened by lack of data. Our earlier research suggests that the present need is for a new governmental mechanism to analyze existing data, to allow coherent views of overall national programs and alternatives, and to permit firmly based forecasts.²¹ The need, in short, is for better management of existing data, rather than for still more undigested information.

Potential new data management systems can be pictured on a spectrum of measures from maximum to minimum change in existing institutional arrangements—a continuum of progressively stronger policy options for organizing and integrating current government systems. At the least, one may set up a new agency to maintain a directory of existing information sources, and to refer interested persons to an appropriate agency. At the other end of the spectrum is a new independent commission with extensive new authority to collect and analyze information, to validate this information by direct audit or inspection, and to make predictions and policy recommendations. The present authors reviewed the full range of possibilities along this spectrum in an earlier article in which we concluded that an intermediate level of

to them, but federal policymakers may be better able to check on the operations of multinationals. The proposed Bureau may improve the basis of foreign policy concerning materials and trade, support international discussion of materials-related problems, and stimulate the use of satellites for information-gathering purposes.

20. See NATIONAL COMMISSION ON MATERIALS POLICY, *supra* note 10, ch. 4.

21. See OFFICE OF TECHNOLOGY ASSESSMENT, *supra* note 10, at 109-11.

institutional change was most desirable.²² We recommended the creation of a new Bureau of Materials Statistics and Forecasting, with a staff of 150 to 175 persons and a first year budget of six to seven million dollars.²³ This recommendation corresponds to the fourth institutional alternative described to Congress in a recent report by the Office of Technology Assessment.²⁴

The proposed Bureau would provide summary, analytical and forecasting services to policymakers in Congress, the executive branch and the private sector. It would not itself be a policymaking or regulatory agency, and would not have any extensive data gathering authority of its own. It would rely on the information available through existing agencies and under present legislation.²⁵

We have ruled out of consideration a super-statistical agency that would centralize all materials information activities of the federal government.²⁶ Such an agency would constitute an excessive concentration of control and would be an administrative nightmare. The Bureau proposed here would meet the present need for comprehensive views, analysis, and forecasts, and for a central directory to more detailed information, without adding unnecessarily to the size and power of the federal government. The budget and statutory authority of the Bureau would be sharply limited to restrict it to gathering information that is genuinely needed.

The general functions of the Bureau can be briefly summarized.²⁷ It would not duplicate the functions of such agencies as the Federal Energy Administration, but would maintain a directory and referral service to match requests for information with existing resources. It would also act to facilitate exchanges of information among existing agencies and, we hope, to eliminate redundancies. The Bureau would obtain information from existing agencies and supply it to individuals upon request. This clearinghouse and referral function falls, of

22. The range of alternatives is more fully described in Wood, Lamb & Larsen, *supra* note 16, at 414-22.

23. *Id.* at 420.

24. See 1 OFFICE OF TECHNOLOGY ASSESSMENT, MATERIALS INFORMATION SYSTEMS 7-7 (1976); OFFICE OF TECHNOLOGY ASSESSMENT, *supra* note 10, at 180.

25. See Wood, Lamb & Larsen, *supra* note 16, at 412-15.

26. For discussion of this institutional alternative, see *id.* at 405, 416.

27. See *id.* at 415.

course, at the minimum-change end of the spectrum of possible new institutional alternatives.²⁸ To ensure the usefulness and compatibility of information supplied from different sources, the Bureau would establish guidelines for standardizing reporting forms and data recording systems in other agencies as well as coordinate existing data storage and retrieval systems.

The Bureau would be more than a passive clearinghouse, however. It would have a statistical capability, and would provide forecasting and analysis services.²⁹ Through the statistical function the Bureau would provide summaries, trends, and statistics of historical and current materials supply and demand.

A further forecasting and analysis function would be most closely matched to the needs of major policymakers. The Bureau would go beyond statistical analyses and projections to define policy alternatives, and attempt to anticipate important future events, particularly disjunctions between supply and demand of the kind which produced the energy crises of 1973 and of 1977. In its analysis and forecasting work the Bureau would carry out the functions at the further end of the spectrum of new institutions, but without the cost and dislocations attending the creation of a new commission with powers more extensive than those of existing agencies.³⁰

To carry out all its functions most expeditiously, the Bureau would establish a summary base of materials information. This data base would be maintained in electronic form, and would allow rapid retrieval and summary of materials information. The data base would include summary information only; information concerning individual firms and persons would be maintained separately under the safeguards imposed on the agency that first obtained the data.³¹

Eventually the Bureau would receive and analyze information about the full life cycle of every material in use, from extraction to final disposal. Nevertheless, the Bureau could not attempt this comprehensive scope at the outset.³² It would first assemble the data most readily

28. See OFFICE OF TECHNOLOGY ASSESSMENT, *supra* note 10, at 176-79.

29. For discussion of the forecasting and analysis functions of possible materials information systems, see 1 OFFICE OF TECHNOLOGY ASSESSMENT, *supra* note 24, at 4-4 to -5.

30. These impacts are analyzed in *id.* at 8-5 to -8.

31. See notes 62-81 *infra* and accompanying text.

32. See Wood, Lamb & Larsen, *supra* note 16, at 417: "[I]t is unrealistic, unneces-

available, and would gradually expand its coverage, identifying gaps in available knowledge as they appear. Some new data-gathering may be needed to fill these gaps, but this possibility should be left to later legislation when and if the need arises.

The Bureau would be part of an existing agency, rather than standing alone as an independent commission, but its director would be appointed by the President and confirmed by the Senate. A number of locations for a new materials information agency have been proposed, including the Smithsonian's Science Information Exchange³³ and a new Department of Energy and Natural Resources.³⁴ The Bureau could function within a new department, but would take essentially the same form regardless of where it is housed in the present bureaucracy.

III. LEGAL IMPACT AND ISSUES

A. *Legal Impact*

We have selected the Bureau of Materials Statistics and Forecasting from among available alternatives because it will meet the need for better information, analysis, and forecasting without creating any substantial change in the relationship between the federal government and private parties. The Bureau and, *a fortiori*, less extensive programs, will have only slight impact on the rights, privileges, and obligations of private persons. On the other hand, it is intended to have a major impact on relationships among existing federal agencies with responsibilities in the area of materials. An agency with more authority than the proposed Bureau would have a larger impact on private individuals and government agencies. The greatest impacts among those we considered would result from an independent commission's authority to deal directly with individuals and businesses, to obtain data, and to validate existing information.

sary and perhaps impossible—at least for a number of years—for NIMIS to cover materials information on all aspects of the life cycle of all materials.” (emphasis original).

33. See GENERAL ACCOUNTING OFFICE, FEDERAL MATERIALS RESEARCH & DEVELOPMENT: MODERNIZING INSTITUTIONS AND MANAGEMENT 29 (1975).

34. See, e.g., S. ABBASI & W. DONNELLY, REORGANIZATION AND PROPOSED REORGANIZATION RELATING TO ENERGY AND NATURAL RESOURCES 5 (Congressional Research Service, August 29, 1973). The most recent proposal for a new Department of Energy and Natural Resources came from the National Commission on Supplies and Shortages. See Wash. Post, Jan. 10, 1977, at A-3, col. 3. The Carter Administration is expected to propose an Energy Department excluding other resources. *Id.*

1. *Data Collection and Validation*

Federal agencies have traditionally relied on data provided voluntarily by business enterprises, and usually have not needed to validate data by direct investigation. Public concern over the effects of corporate activities, however, has led to the creation of extensive new investigatory and enforcement powers in environmental and safety legislation,³⁵ as well as in economic and energy statutes.³⁶ Some current legislative proposals for new materials information systems would continue this trend.³⁷ We recommend a bureau that would rely on existing agency authority, as we do not feel there is any need to extend reporting requirements or investigatory power at this time. If a new materials information system of whatever kind, once established, cannot function properly without new authority to validate data, Congress can deal with the problem when it appears.

2. *Freedom of Information Act*

The purpose of any new materials information system would be, in part, to inform the public about the kinds of data held by federal agencies and to provide access to those data. It is reasonable to suppose that one impact of such a system will be increased requests for information and, when such requests are denied, more demands under the Freedom of Information Act (FOIA).³⁸ The legal issues raised by such demands are discussed below.³⁹ Here we note only the possibility that legislation establishing a Bureau of Materials Statistics and Forecasting, or any other materials information system, may alter the conditions under which disclosure can or must be made. Congress might create an exemption under FOIA for materials information. Specific standards of confidentiality for sensitive materials information would benefit federal agencies, materials corporations, and parties seeking such information.

35. See, e.g., Occupational Safety and Health Act of 1970, 29 U.S.C. §§ 651-678 (1970); National Environmental Policy Act, 42 U.S.C. §§ 4343-4347 (Supp. V 1975).

36. See, e.g., Economic Stabilization Act, 12 U.S.C. § 1904 (1970); Federal Energy Administration Act, 15 U.S.C. §§ 761-786 (Supp. V 1975); Energy Supply and Environmental Coordination Act § 11, 15 U.S.C. § 796 (Supp. V 1975).

37. See bills cited note 10 *supra*. Cf. Breyer & McAvoy, *The Natural Gas Shortage and the Regulation of Natural Gas Producers*, 86 HARV. L. REV. 941 (1973) (government intervention may be self-defeating).

38. 5 U.S.C. § 552 (1970).

39. See notes 62-69 *infra* and accompanying text.

3. *Government Agency Exchange of Materials Information*

There is now considerable duplication and conflict among the multitude of federal agencies collecting and analyzing materials information.⁴⁰ Any new materials information system will have a positive impact on this situation, and the proposed Bureau should improve it significantly. The Bureau would require cooperation among agencies that now collect materials information, eliminating duplication; data would be reported and kept in standardized form. Agencies would be encouraged and required to exchange information among themselves or through the Bureau; enabling legislation for the Bureau would remove any present statutory barriers to such exchange. At the same time, of course, the Bureau would be required to maintain the confidentiality now accorded data submitted to the separate agencies. Conflict between needs for information and confidentiality already exists, and is discussed below.⁴¹

The Bureau will require some information concerning foreign affairs and defense activities that other agencies may decline to provide on grounds of national security or executive privilege. The enabling legislation should provide a mechanism for resolving such disputes.

The recommended Bureau is unlikely to disrupt existing data-collecting activities, but a commission with extensive authority to collect and validate data itself may very well cause such disruption.⁴² Existing patterns and arrangements of materials data exchange would be altered; existing agencies would continue to bear the principal responsibility for the actual collection of data, although their authority would be reduced. There is, then, a potential for conflict between a new authoritative commission and existing agencies: Information might actually be more strictly compartmentalized if the new commission and existing agencies withheld data from each other. Consequently, we propose a Bureau of limited authority that would neither reduce the present budget of any existing agency nor interpose itself between existing agencies and their constituencies.

4. *Impact on Other National Programs and Policies*

The data base of the proposed Bureau will undoubtedly permit

40. See note 13 *supra* and accompanying text.

41. See notes 56-81 *infra* and accompanying text.

42. Interviews and questionnaire responses, *supra* note 17.

analysis of issues other than materials supply. It will show the degree of concentration of ownership in various materials fields, and may give evidence of anticompetitive practices. The result may be more vigorous enforcement of antitrust statutes, or new legislation. The Bureau may assist federal agencies in fulfilling the reporting requirements of the National Environmental Policy Act⁴³ and may assist in land use planning activities.

Information assembled and analyzed by the Bureau or another materials information system will be available to private parties as well as the government. We discuss below, among economic and social impacts, the effect of the materials information system outside the government.⁴⁴

B. *Legal Issues*

Any new agency to collect and disclose information from private sources sharpens two existing questions: The proper extent of federal intrusion into private activity, and the conflict between the need for disclosure and the need for confidentiality.

1. *The Federal Government and Private Sector Data*

Business corporations generate most information concerning materials supply and demand. The congressional power to regulate interstate and foreign commerce, to provide for the national defense, and to regulate the disposition of federal property⁴⁵ clearly would justify legislation to compel disclosure by corporations of information concerning materials, except when disclosure would infringe on some countervailing constitutional privilege. The fifth amendment's protection against self-incrimination does not extend to corporate books and records.⁴⁶ The fourth amendment does protect corporations against unreasonable search and seizure, however, although standards are less strict than those for the protection of individuals.⁴⁷

Information may be valuable corporate property. When its value

43. 42 U.S.C. §§ 4332, 4343, 4346a-b, 4347 (Supp. V 1975).

44. See notes 104-28 *infra* and accompanying text.

45. U.S. CONST. art. I, § 8; *id.* art. IV, § 2.

46. See *Hale v. Henkel*, 201 U.S. 43 (1906) (corporations not "persons" for purposes of self-incrimination clause of fifth amendment).

47. See *United States v. Morton Salt Co.*, 338 U.S. 632 (1950).

depends upon secrecy, disclosure may be a deprivation of property.⁴⁸ This objection will generally bear only on public disclosure or disclosure to competitors, and will not bar reporting to the government under adequate assurances of confidentiality. The Freedom of Information Act contains provisions to protect proprietary information⁴⁹ obtained by the government,⁵⁰ and the new materials information system, whatever form it eventually takes, is unlikely to alter present guarantees of confidentiality. Limitations on disclosure to the public are discussed below.⁵¹

The federal government therefore has ample authority to obtain information from which to prepare summaries, analyses, and forecasts so long as the secrets and competitive positions of individual businesses are not compromised. This authority will suffice to permit the proposed Bureau, or any materials information system, to function.

While this power of the federal government cannot be doubted, the propriety of further invading the province of private business activity should be considered. Most people agree that the private sector is generally better able than government to carry out most materials-related economic activities in the United States. The federal government accordingly limits its role to supporting the private sector's own materials information activities, either directly⁵² or through grants and contracts to specialized private sector information centers.⁵³ Until recently, the federal government had little need for materials information on its own activities. The strength and qualities of materials were of interest largely to manufacturers, and supply and demand were important only to buyers and sellers of commodities. The federal government had little need to determine what information would be valuable to private companies and little inducement to develop such information itself.

The history of industrialization is the history of increasing regulation of private activity; the materials sector of the economy has not escaped

48. See R. MILGRIM, *TRADE SECRETS* §§ 1.01-1.10 (10th ed. 1976) (trade secrets as form of property), and cases cited therein.

49. Companies generally object to disclosing information about sales volumes, costs, and prices as well as the details of production processes usually thought of as trade secrets.

50. 5 U.S.C. § 552 (1970).

51. See notes 62-74 *infra* and accompanying text.

52. Direct support includes that provided through the National Bureau of Standards' Standard Reference Data System, for instance.

53. These information centers include the Metals and Ceramics Information Center at the Battelle Memorial Institute, Columbus, Ohio.

the general pattern of development. In a world of growing shortages, in which domestic and international policy increasingly require accurate information about materials, it is clear that the federal government must have its own stock of information. Private decisionmakers also increasingly need data on overall national resources, reserves, and demand which private corporations cannot compile because of industrial secrecy and antitrust considerations. Both for its own use and for the needs of the private sector, then, the federal government has assumed a more important role in assembling materials information and now collects a broad range of materials data from the private sector.⁵⁴

Only a fraction of private sector data is actually necessary for federal policymaking, however, and most of this is already in government hands. Some further information on energy consumption, transportation, and life-cycle costs of materials may be needed, but the results of our work suggest that the government's materials information problem is primarily one of inadequate information management, ineffective systems integration, and insufficient analysis rather than incomplete data.⁵⁵ The government, although it has an important role to play in this field, should not request additional materials data from the private sector until first placing its own house in order.

The foregoing considerations lead us to conclude that a new federal information system should restrict itself, at least at the outset, to coordinating and analyzing existing information, and determining the need, if any, for further data. We feel that an agency with authority beyond these functions is not now justified; but an agency with less authority would not meet the information and analysis needs of policymakers.

2. *Openness in Government and Protection of Confidential Business Information*

As noted earlier, the government has authority to gather information, the value of which can be destroyed by disclosures.⁵⁶ Disclosures may also put a firm at a disadvantage in dealing with competitors, suppliers, customers, or the government itself. If the government could operate in complete secrecy, private interests would not be disturbed. Our gov-

54. See notes 9-13 *supra* and accompanying text.

55. See notes 9-13 *supra* and accompanying text. See also Wood, Lamb & Larsen, *supra* note 16, at 386.

56. See notes 45-51 *supra* and accompanying text.

ernment must hold itself open to public inspection, however. The public's right to know what the government is doing is guaranteed under the Freedom of Information Act⁵⁷ and the Federal Advisory Committee Act.⁵⁸ Furthermore, the affirmative purpose of many federal activities is disclosure. The Departments of Commerce, Agriculture, and Interior, the Federal Energy Administration, and the Securities and Exchange Commission all have obligations to publish statistics and—in the case of the SEC—particular information about materials and the companies which deal with them.⁵⁹ Any proposal for a new materials information system will accordingly inflate the amount of public reporting of such information, much of it derived from private sources.

The Bureau proposed here will have a computerized data base that will become part of a network of federal computers. The summary data bank will likely have direct connection with other agencies, and to this extent the new Bureau will contribute to the growth of interconnected computer data banks and retrieval systems. The growing centralization of such records increases the impact of any abuse, and underscores the importance of legal restraints on the invasion of privacy through such computerized systems. While government should operate in the open, the existence of such data banks containing private or proprietary information requires a certain level of secrecy.

Existing statutes can resolve the conflict between commercial secrecy and government openness if the Bureau of Materials Statistics and Forecasting is properly established and operated. This general topic has been addressed elsewhere,⁶⁰ and we will discuss it only briefly as it pertains to our proposal.⁶¹

a. *Existing Legislation*

Nine categories of information are exempt from compulsory disclosure under the Freedom of Information Act.⁶² Of particular relevance

57. 5 U.S.C. § 552 (1970 & Supp. IV 1974).

58. 5 U.S.C. App. I, §§1-15 (Supp. V 1975).

59. See *Domestic Supply Information Act*, *supra* note 10, at 149-54.

60. See generally Note, *The Privacy Act of 1974: An Overview and Critique* 1976 WASH. U. L.Q. 667.

61. We deal only with the conflict between property rights of business enterprises and the requirements of disclosure. Personal privacy is rarely involved in materials information and is not considered here. See notes 56-81, *supra* and accompanying text; text accompanying note 126 *infra*.

62. 5 U.S.C. § 552(b) (1970 & Supp. IV 1974).

to materials information systems are the third and fourth exemptions. The third exemption, matters specifically exempted by statute, preserves the protections of confidentiality afforded under other statutory provisions.⁶³ The fourth exemption protects trade secrets and commercial or financial information.⁶⁴ To fall within this exemption, the information must be a trade secret under the strict meaning of the term, or commercial or financial information obtained from a person (including a corporation) and privileged or confidential.⁶⁵ "Trade secret . . . means an unpatented, secret, commercially valuable plan, appliance, formula, or process, which is used for the making, preparing, compounding, treating, or processing of articles or materials which are trade commodities."⁶⁶ Privileged information includes matters covered by traditionally recognized privileges, such as the lawyer-client privilege. Commercial or financial information is exempt from disclosure, if privileged, or if within the standard of confidentiality set forth in *National Parks and Conservation Association v. Morton*.⁶⁷ Information is confidential under this exemption if its disclosure is likely to impair the government's ability to obtain necessary information in the future or to cause substantial harm to the competitive position of the person from whom the information is obtained. When the government has mandatory authority to obtain the necessary information, the first test in *National Parks* is inapplicable since no impairment of its collection power could occur.⁶⁸ The government and the source bear the burden of showing a likelihood of substantial harm to competitive position from disclosure. Agency practices that confer blanket confidentiality to information supplied by private sources will not be upheld in the absence of a specific statutory protection.⁶⁹

Even when a document falls within one of the exemptions, the deletion of information identifying the source is often enough to remove the protection of the exemption. Furthermore, the Freedom of Informa-

63. 5 U.S.C. § 552(b)(3) (1970). See *Administrator, Federal Aviation Admin. v. Robertson*, 422 U.S. 255 (1975).

64. 5 U.S.C. § 552(b)(4) (1970).

65. *Id.*

66. See, e.g., *United States ex rel. Norwegian Nitrogen Prod. Co. v. United States Tariff Comm'n*, 6 F.2d 491, 495 (D.C. Cir. 1925), *rev'd on other grounds*, 274 U.S. 106 (1927).

67. 498 F.2d 765, 770 (D.C. Cir. 1974).

68. *Id.*

69. See 88 HARV. L. REV. 470 (1974).

tion Act exemptions do not forbid disclosure; they are discretionary. Documents and records may be released to the public even though covered by one or more exemptions, when such release would not constitute an abuse of discretion or violate other statutory prohibitions.

Section 1905 of title 18 of the United States Code imposes criminal penalties for the unauthorized disclosure of trade secrets and confidential information by federal officials and employees.⁷⁰ This statute covers information relating to "trade secrets, processes, operations, style of work, or apparatus, or to the identity, confidential statistical data, amount or source of any income, profits, losses, or expenditures of any person, firm, partnership, corporation, or association."⁷¹ Other statutes refer to section 1905 for its definition of trade secrets and confidential information. The section does not create further exemptions to the Freedom of Information Act but merely punishes the *unauthorized* disclosure of such information, whether exempt or nonexempt under the FOIA. Section 1905 has been the basis for several "reverse freedom of information suits" in which corporations attempt to enjoin agency release, pursuant to a FOIA request, of documents concerning them. Corporate plaintiffs have asserted that release of information exempt under the FOIA and described in section 1905 violates the criminal prohibitions of section 1905 and, therefore, constitutes an abuse of discretion reviewable under the Administrative Procedure Act.⁷²

Beyond the criminal sanctions of section 1905, many statutes dealing with specific commodities or agencies contain criminal penalties for unauthorized disclosure of protected information. Moreover, the Federal Reports Act contains provisions that set forth conditions under which confidential information obtained by one federal agency may be released to other federal agencies and extends the application of any legal restriction on the use of such information by the first agency, including penalties for unlawful disclosure, to the officers and employees of the second agency.⁷³ The Federal Reports Act, in combination with specific statutory grants of confidentiality, will preserve within the materials information system the confidential classification of information obtained from private sources.

70. 18 U.S.C. § 1905 (1970).

71. *Id.*

72. 5 U.S.C. §§ 701-706 (1970). *See, e.g.,* Charles River Park "A", Inc. v. HUD, 519 F.2d 935 (D.C. Cir. 1975); Sears, Roebuck & Co. v. GSA, 509 F.2d 527 (D.C. Cir. 1974).

73. 44 U.S.C. §§ 3501-3511 (1970).

Government and industry executives interviewed by the authors were greatly concerned that broad public access to the materials information system would result in the unwarranted disclosure of corporate "proprietary information."⁷⁴ "Proprietary information" is a broad, overused term that seemingly is applied to any information possessed by a corporation. The term is not synonymous with confidential information, privileged information, or trade secrets, as previously defined. Nor is it, in itself, a category of protected business information. While assertions of corporate secrecy and privacy are an insufficient basis to refuse disclosure of corporate information to government agencies, some recognition of the needs of business entities is needed to prevent certain sensitive information from being revealed to their competitors and the public. Government agencies recognize this legitimate concern and carefully protect such sensitive matters to preserve good relationships with their information sources.⁷⁵ Corporate "proprietary information" is protected from public disclosure to the extent that it comes under specific statutory provisions.⁷⁶

b. *Adapting the Bureau to Existing Statutory Provisions*

The proposed Bureau or any materials information agency would hold complex data on materials, resources, production, and consumption. To ensure its data base, the Bureau would have to obtain from other agencies commodity-specific information about ownership of private firms; lines of business, according to commodity and sector, of the materials economy; finances; geographical locations of business operations; past and future sales and shipments; inventories, reserves, and proven resources; plant capacity and level of production; suppliers and customers; and proposed major changes in business operations. Corporations regard these data as sensitive "proprietary information."⁷⁷ Existing statutes or regulations may protect all of them from public disclosure. Several agencies collect detailed ownership, line of business, and geographical information for statistical purposes.⁷⁸ Such data are often covered by absolute restrictions on disclosure—not because it would harm the source's competitive position but because use of the

74. Interviews and questionnaire responses, *supra* note 17.

75. *Id.*

76. See also notes 35-40 *supra* and accompanying text.

77. Interviews and questionnaire responses, *supra* note 17.

78. *Id.*

information by antitrust and taxing authorities would jeopardize the ability of the collecting agency to obtain necessary data in the future. Under the Federal Reports Act,⁷⁹ original restrictions continue in effect on any use of the original agency data by a materials information agency. Commercial and financial information not protected by other statutes would qualify for confidential treatment under an exemption to the Freedom of Information Act if disclosure would harm the source's competitive position or impair government ability to obtain such information in the future.⁸⁰

Although release of detailed financial data could harm a company's competitive position and clearly should be classified as confidential, general financial information published in a company's own annual report would not be exempt. Materials industry sources told the authors that data on current and future sales, inventories, reserves, production levels, suppliers, and customers are highly sensitive but should be included in a federal information system because they are of critical importance to the development of accurate industry statistics and trends.⁸¹ Release of this information could reveal the position of an individual company to its competitors and would place it on an unequal footing when bargaining with suppliers and customers. Special precautions should therefore be taken to assure that individual reports containing such highly sensitive and essential information are not released without first deleting any identifying material. Past sales and plant capacity information are generally not considered to be confidential and are frequently made public. Consequently, in the absence of special circumstances, their release would not be harmful.⁸²

To sum up, the majority of materials data supplied by companies would be exempt from disclosure under the Freedom of Information Act; other statutes and regulations provide additional protection from harmful public disclosure of sensitive corporate information. The design of the statistical information system also offers protection to individual company data. The system is primarily concerned with statistical trends and would use information aggregated from individual reports. Special identifying codes could protect the anonymity of individual data sources, and internal system security could limit access to

79. 44 U.S.C. §§ 3501-3511 (1970).

80. 5 U.S.C. § 552(b)(4) (1970).

81. Interviews and questionnaire responses, *supra* note 17.

82. *Id.*

individual reports, to reduce possibilities of accidental disclosure. The system probably would utilize statistical sampling methods and would survey only a small number of firms in each of the many sectors of the materials industry. Massive files on each company in the materials industry would not accumulate if this approach is used. Acceptance of the system would be promoted by advance determination, through regulatory or legislative action, of the standards for classification of confidential information and for the availability of individual company reports for inspection by other government agencies. The interaction of system design, with existing government policies on openness and confidentiality, would result in a materials information system that offers comprehensive and accurate materials information to government and public users, and that utilizes and protects sensitive corporate information.

IV. GOVERNMENTAL IMPACT AND ISSUES

A. *Governmental Impact*

1. *The Federal Government*

The Bureau of Material Statistics and Forecasting, or any materials information system, should work primarily to improve the functioning of government. Its impact on government operations should therefore be substantial and positive. The Bureau would have two general objectives—to assist government officials in planning and setting priorities, and to provide information to help in making specific decisions.⁸³ The Bureau will clearly strengthen these activities. A limited referral service or clearinghouse would have much less effect, as decision-makers in the executive branch and Congress are already aware of present sources of information. An information service which is not tailored to the needs of policymaking will therefore have little or no impact. At the opposite extreme, a commission with independence and power to validate data at their source would have broader authority

83. See Wood, Lamb & Larsen, *supra* note 16, at 386-88. The growing importance of these objectives is evidenced by the establishment of the short-lived National Goals Commission, the creation of a Congressional Budget Office, strengthening of planning support activities in the General Accounting Office and the Congressional Research Service, establishment of the Office of Technology Assessment, and recent efforts by the Office of Management and Budget to develop a management-by-objectives approach for formalized priority-setting. See *id.* at 392-97.

and might inspire greater confidence in the system. Some independence from the executive branch may also make a commission more useful to, or more trusted by Congress, but this same independence could lead to its removal from the mainstream of policy-related activity and permit duplication of its function in executive and legislative agencies.⁸⁴

The Bureau proposed here would supply an improved flow of information, analyses, and forecasts for use in resolving specific difficulties. The Bureau would make complete use of available information; whether this would be adequate cannot be determined in advance. A more restricted agency would necessarily provide less useful information and have a correspondingly smaller impact.

Any new agency must face potential conflicts with the existing bureaucracy.⁸⁵ The importance and visibility of federal agencies, and to a lesser degree the congressional committees and subcommittees which oversee them, will be affected by any new arrangements, however modest. A statistical and forecasting bureau would provide new functions for existing agencies and would encounter less antagonism than a major independent commission with authority to supercede existing agency activity.

2. *State and Local Government*

During times like the natural gas shortage earlier this year, resources must be allocated among competing regions and states. Natural resources may be developed in some areas, where environmental impacts will be correspondingly strong, but distributed in other areas. Local governments will make different determinations of the amount of environmental degradation they will tolerate and of the economic development they will seek to encourage. All of these differences require considerable local planning and regulation. A federal materials information system will presumably be useful to decisionmakers at the local level in the same way that it will help federal officials. Better information may enhance cooperation among local governments, or it may sharpen competition among them. Cooperation between local and federal government should be enhanced, to the advantage of all concerned. If a federal agency engages in extensive activity to verify data, or disrupts existing relationships between local governments and federal agencies,

84. *Id.* at 405.

85. *See generally id.* at 399-411.

however, increased resentment or distrust might outweigh the benefits of the system.⁸⁶

3. *Public Participation in Government*

The public has been active in materials policy when it intersects with environmental considerations.⁸⁷ Shortages, higher prices, and increasing pressure for development of public lands assure that public participation in decisions will continue to grow. Such participation is a major source of conflict over release of confidential industry data.⁸⁸ Lower level referral and clearinghouse functions will benefit members of the public more than government or industry officials, and the full range of statistical and forecasting functions will assist, and thereby encourage, public intervenors in the decisionmaking process.

B. *Governmental Issues*

One of the purposes of the proposed new agency would be to aid government planning. The question therefore arises whether this is a desirable objective. Planning is now generally carried out—if at all—by informal elite groups in government and the community at large.⁸⁹ Formal planning within the government bureaucracy suggests to many Americans ideas of socialism, undermining the free market, and diminution of individual rights. Over the last fifty years, however, Americans have come to acknowledge that to some extent industrial growth must be examined, guided, and coordinated through planning processes. Planning cannot ensure that this nation's future evolution will be orderly or in the public interest. Yet it will increase the likelihood of these developments, a fact perhaps better recognized by the public today than ever before. Planning need not be centralized, however, and the present proposal rests in part on the modern view that

86. Interviews and questionnaire responses, *supra* note 17.

87. *See, e.g.*, W. REILLY, *THE USE OF LAND: A CITIZENS' GUIDE TO URBAN GROWTH* (1973); Sewell & O'Riordan, *The Culture of Participation in Environmental Decisionmaking*, 16 NAT. RESOURCES J. 1 (1976).

88. Activist groups seeking to alter private business practices frequently seek data given by industry to federal agencies. Increasing demands for such data under the Freedom of Information Act contribute to the reluctance of industry to submit confidential data to federal agencies.

89. *See, e.g.*, R. DAHL, *WHO GOVERNS?* (1961); F. HUNTER, *COMMUNITY POWER STRUCTURE* (1953); C. MILLS, *THE POWER ELITE* (1956).

planning should be dispersed among state and federal governments.⁹⁰ Hence a materials information system would provide services useful to government at all levels, but would *not* itself be a central national planning agency.

1. *Materials Planning in the Federal Government*

Federal agencies dealing with materials policy are inadequately organized, hold conflicting and uncoordinated data, and have insufficient analytical resources.⁹¹ In such circumstances it is difficult for any branch of government to formulate clear plans. Decisions have tended to be crisis-oriented and the many consumer and producer interest groups concerned about consistent national policy have had only limited influence.⁹²

The Bureau of Materials Statistics and Forecasting, or any materials information system, should be designed to alter this situation. The Bureau would standardize and coordinate the information-gathering activities of government, reduce overlap and friction, provide a central source of comprehensive information, and supply the analytical effort needed to reduce the mass of data to useful form. These efforts should provide better information on which to base short-run decisions, and the necessary preconditions for long-range planning.

2. *State and Local Materials Planning*

State and local governments are rapidly turning to conservation planning, resource management, and material re-use. They are concerned with rising prices, problems in supply and distribution, and substitutions and interactions among materials. A national materials information system would assist local governments and stimulate the trend toward formal planning organizations.⁹³ Projections of future materials supply and demand trends would clearly assist local and state governments in land use planning.⁹⁴ Interviews conducted by the authors

90. See Grodzins, *Centralization and Decentralization in the American Federal System*, in *A NATION OF STATES 1* (R. Goldwin ed. 1963).

91. See, e.g., GENERAL ACCOUNTING OFFICE, *supra* note 10.

92. *Id.* at 31-32.

93. For an analysis of state data needs, see COUNCIL OF STATE GOVERNMENTS, *NATURAL RESOURCE DATA NEEDS* (1976).

94. State governments have greatly increased their land use planning activities in recent years. See F. BOSSELMAN & D. CALLIES, *THE QUIET REVOLUTION IN LAND USE*

suggest that many local government officials do not want to be told by the federal government how to plan the use of land; but they do want and need systematic data, projections of residential and industrial development, and information on the impact of development on resources, land and the environment generally.⁹⁵

The 1975 National Governors Conference produced a proposal for a national clearinghouse for energy information:

[T]he federal government can take the lead in amassing the information on which every level of government and private actions can be most confidently based. The federal government should accumulate data from public and private sources and establish a framework in which energy information is maintained accurately, completely, currently and in uniform modes.⁹⁶

This language could easily be applied to any resource or commodity of importance to local economies. Producing and consuming states need information about supply and demand, environmental impact, and possible substitutions—information that is difficult and costly to assemble at the local level. A national Bureau of Materials Statistics and Forecasting would therefore add independence and security to decisions made by state and local governments.

Our interviews also suggest that friction instead of cooperation will result if the federal materials information system becomes a central planning and policymaking agency, rather than a service bureau meeting needs of government at all levels.⁹⁷ This feeling was reflected in a resolution at the 1975 Governors Conference praising the creation of two new agencies to separate the regulatory from the research and promotional activities of the former Atomic Energy Commission.⁹⁸

3. *Public Participation in Decisions and Planning*

Data and analyses produced by the proposed Bureau will be available to the general public and to special interest groups. Much information is presently available, and presumably will continue to be so under the

CONTROL (1971); COUNCIL OF STATE GOVERNMENTS, STATE GROWTH MANAGEMENT (1976).

95. Interviews and questionnaire responses, *supra* note 17.

96. NATIONAL GOVERNORS CONFERENCE, DRAFT OF RESOLUTIONS 16 (1975).

97. Interviews and questionnaire responses, *supra* note 17.

98. NATIONAL GOVERNORS CONFERENCE, *supra* note 96, at 28-29.

Freedom of Information Act in any new or improved system.⁹⁹ More ample and useful information is therefore likely to create more extensive and effective public participation in the political process.¹⁰⁰ Such participation is generally considered necessary and desirable in a democracy.¹⁰¹ Our interviews suggest what might have been supposed—that information is now much more accessible to some groups than to others.¹⁰² A new federal information system will remedy this imbalance to some degree. The extent of such impacts on the political process will depend on how extensive and successful a new information system proves to be. The influence of industrial trade associations and the private sector generally may be somewhat lessened, as these groups now have much better sources of information and analysis than other sectors of society. This loss of influence will be only relative, however, and not absolute, as other groups acquire a share of the information needed to influence policy.

With extensive information available at little or no cost, local government officials, self-designated “public interest” groups, environmentalists and segments of the business community will undoubtedly increase their participation, or attempts to participate, in materials plans and decisions.¹⁰³ Such participation will be both more extensive and better-informed than it is at present. The existence of a single comprehensive data base will make it much easier for various individuals and groups to deal with problems that involve data now scattered among several agencies. Full life-cycle costs in terms of energy and materials, for instance, will be available for a number of consumer product categories, facilitating more extensive and better informed discussion about alternative products and recycling.

V. ECONOMIC IMPACT AND ISSUES

Private industry must supply the nation’s materials, increasingly from foreign sources,¹⁰⁴ while absorbing many of the costs of environmental

99. 5 U.S.C. § 522(b) (1970 & Supp. IV 1974).

100. See, e.g., K. DEUTSCH, *THE NERVES OF GOVERNMENT* (1966); McClosky, *Political Participation*, 12 INT’L ENCYC. SOC. SCI. 252 (1968).

101. See McClosky, *supra* note 100, at 253.

102. Interviews and questionnaire responses, *supra* note 17.

103. *Id.*

104. See AD HOC COMMITTEE ON THE DOMESTIC AND INTERNATIONAL MONETARY EFFECT OF ENERGY AND OTHER NATURAL RESOURCE PRICING, *supra* note 2, at 71-93.

improvement.¹⁰⁵ A new materials information system will tend to improve the private sector's ability to meet national materials needs; clarify the extent to which materials may be substituted for each other and the areas in which further research is needed to identify substitutes; support industrial planning; affect competition in the materials industry; increase government-industry cooperation in materials policy development and implementation; and clarify choices among consumer products. These economic effects are not always distinguishable from the political effects discussed above; there is a "politics of economics" with which resource policymakers must cope.¹⁰⁶ For convenience, however, we will discuss the possible economic effects of a new materials information system here.

A. *Improved Ability of the Private Sector to Meet National Materials Needs*

Both industry and government must have adequate information to play their proper roles in supplying raw materials and finished goods. The basic supply task is that of industry, while government supports, regulates, and in some cases subsidizes industry's activities. Industry is constrained in information gathering by several factors: its own resource limitations, the complexity and diffusion of federal processes of information gathering and analysis, the need to protect proprietary information, and antitrust restraints on sharing of information, forecasts and planning activities.¹⁰⁷ The government can ease some of these constraints by centralizing and aggregating data in such a way that information affecting the competitive position of individual companies is protected.

Aggregate data is often available from such trade associations as the American Petroleum Institute or from commercial sources like the McGraw-Hill business information services, which are almost as extensive as the information systems available to European governments that engage in extensive planning.¹⁰⁸ There is no private source of comprehensive materials information, however, and there is not likely to be

105. See, e.g., Freeman & Haverman, *Residuals Charges for Pollution Control: A Policy Evaluation*, 177 *SCIENCE* 322 (1972); Gerhardt, *Incentives to Air Pollution Control*, 33 *L. & CONTEMP. PROB.* 358 (1968).

106. *Domestic Supply Information Act*, *supra* note 10, at 208.

107. Interviews and questionnaire responses, *supra* note 17.

108. See A. SHONFIELD, *MODERN CAPITALISM* 347-50 (1965).

within the constraints of present antitrust laws. A trade association in a single industry may be able to avoid the issue of competition among individual firms by publishing aggregate data. The same association can include customers and suppliers as in the National Coal Policy Conference, which joins mine operators with their largest customers, the utilities and railroads, to compile both supply and demand figures.¹⁰⁹

When industries are in overall competition among themselves, however, it seems unlikely that a trade association or commercial service can unite them. Beverage container manufacturers and environmentalists; virgin ore producers and scrap metal dealers; aluminum, plastic and lumber producers—it is difficult to imagine a trade association that would command the frankness and confidence needed to assemble complete information from such strongly opposed groups as these. A more fundamental obstacle to information gathering in the private sector, however, is the pervasiveness of materials information. All industrial activity and much of the service sector of the economy is involved in the handling and use of materials. A private agency with exclusive access to the full range of this information would probably not be politically acceptable; the American Petroleum Institute's former monopoly of oil information led to much conflict and suspicion during the 1973 energy crisis, and was eventually abrogated by statute.¹¹⁰ A private monopoly of materials information would certainly be even less acceptable to the public and to Congress.

Comprehensive national materials information data thus will not be available to industry unless they are collected and supplied by the federal government. Such information should help private industry meet the nation's needs for materials in the face of competing demands for environmental quality and independence from foreign sources of supply.

B. *Industrial Planning and Research*

Industry must now take into account a range of considerations far more extensive than the traditional criteria of profitability.¹¹¹ Tech-

109. See S. NOVICK, *THE ELECTRIC WAR* (1976). Another trade association, the Atomic Industrial Forum, includes manufacturers of electrical equipment, their power-company customers, financial institutions, labor organizations and conservation groups. *Id.* at 30.

110. See Federal Energy Administration Act, 15 U.S.C. §§ 761-786 (Supp. V 1975).

111. Large corporations planning their future must now consider national and inter-

nological forecasting, developed since World War II, is paralleled by corporate interest in social and policy forecasting in which large corporations have a considerable advantage over smaller concerns.¹¹² Even the largest corporation is likely to benefit from the opportunity to mesh its plans and assumptions with government forecasts of national needs. The proposed Bureau of Materials Statistics and Forecasting, we believe, will be useful to businesses of all sizes, although its services will be most useful to concerns too small to maintain their own information or forecasting systems. Basic clearinghouse and statistical services are likely to be of use only to small firms.

Research and development, closely related to corporate planning in general, is or should be guided by knowledge of present unmet needs and by projections of future needs and supplies. In complementary fashion the results of industrial R&D strongly influences projections of supply and demand, and new materials often create new or substitute products.¹¹³ Better information about materials and potential substitutes should lead to more efficient allocation of R&D funds, with greater effort directed at previously neglected areas and reduced efforts in others. The prospect of shortages may spur efforts to develop better means of recycling or conserving materials, or to substitute abundant resources for scarce ones. An overview of materials supply and handling may reveal the need for more efficient, less damaging extractive methods, or particularly wasteful steps in processing may become evident.

Our interviews show that industrial planning, and the closely associated direction of research, have been quite narrowly based, because those charged with decisions have had only limited information about a specific resource or material.¹¹⁴ A Bureau of Materials Statistics and

national policies, world-wide economic fluctuations, political stability in developing countries, consumer relations, changing employment patterns, and social and environmental impacts of their activities. See, e.g., STAFF OF CONSUMER SUBCOMM., SENATE COMMERCE COMM., 92d CONG., 2d SESS., INITIATIVES IN CORPORATE RESPONSIBILITY (Comm. Print 1972).

112. See generally *Materials Shortages, Impact on Small Business: Hearings Before the Senate Subcomm. on Retailing, Distribution, and Marketing Practices of the Select Comm. on Small Business*, 93d Cong., 2d Sess. 145-46 (1974). For modern techniques of forecasting, see note 127 *infra*.

113. See GENERAL ACCOUNTING OFFICE, FEDERAL MATERIALS RESEARCH & DEVELOPMENT (1975); NATIONAL COMMISSION ON MATERIALS POLICY, *supra* note 10, at 10-1 to -19.

114. Interviews and questionnaire responses, *supra* note 17.

Forecasting will provide an opportunity to improve planning and research by making available information on trends in materials allocation, source, and rate of depletion. As confidence in the accuracy of the Bureau's data grows, large corporations will be able to use them to forecast supply and demand with more confidence and thus to make long-term investments with fewer risks. They would be in a position to commit major capital outlays for increased supply or for new processes for materials substitutions, recycling and disposal.

Smaller firms seem at first glance to be the greatest likely beneficiaries of a new information system, as they are at present under a considerable information disadvantage.¹¹⁵ But small businesses that now do very little long-range planning may not be able to make use of an improvement in volume and quality of information. The existence of the data may not itself make much difference, but it will at least create greater opportunities for innovation among many small firms in the materials industries.

C. *Clarification of Materials Substitution and Research Options*

Although only one facet of industrial research and planning, this subject is sufficiently important to warrant separate mention. As natural materials grow scarce, substitutions become increasingly significant.¹¹⁶ Materials substitution requires effective forecasting of availability and costs; it also requires information about consumer acceptance, materials performance, and health, safety, and environmental aspects of potential substitutes. Research and development programs may be necessary and must be initiated well in advance of critical needs. A flow of materials information, including both technical information and identification of ongoing R&D, is crucial to this process and has important implications for governmental policymakers as well as industry. The capability for analysis and forecasting provided by the Bureau of Materials Statistics and Forecasting, or any more extensive program, would serve to alert industry to impending demands and constraints in time to incorporate this information into long-range corporate planning, investment and research strategy.

115. See *Materials Shortages, Impact on Small Business*, *supra* note 112, at 145-46.

116. See, e.g., Goeller & Weinberg, *The Age of Substitutability*, 191 *SCIENCE* 683 (1976).

D. *Competition in the Materials Industry*

Competition among existing suppliers should sharpen as shortages appear, but there has always been a strong tendency toward oligopoly, and horizontal combination among producers of competing materials, in the materials industry.¹¹⁷ Overall, competition in the materials area seems to be decreasing.¹¹⁸

As suggested earlier, a new or improved materials information system would tend to decrease the disadvantages of small firms relative to large firms by improving their access to existing data sources, and by supplying basic statistical analyses and forecasts.¹¹⁹ The smallest improvement in present information systems, such as a referral service-clearinghouse function, would assist small firms. To this extent a materials information system would maintain competition. On the other hand, the tendency to use the same basic forecasts and analyses could produce uniformity indistinguishable from collusion, discouraging experiments and high-risk ventures.

E. *Cooperation Between Government and Industry*

The traditional American view is that cooperation between government and industry is not generally desired and is indeed suspect, except perhaps in the cases of the defense industry and regulated monopolies. The long-term trend, however, may be toward increasing interdependence of public and private agencies because of the greater pressure on resources, the growing complexity of the economy, the increasing costs of research and technology, and the large investments in productive capacity that will be needed in coming years.¹²⁰ Public pressure for resource conservation and environmental improvement is forcing a change in the traditional division of costs between public and private sectors, and the allocation to private industry of what were once considered social costs will require a certain degree of cooperation if it is

117. See, e.g., A. SAMPSON, *THE SEVEN SISTERS* (1975); SPECIAL SUBCOMM. ON INTEGRATED OIL OPERATIONS, SENATE COMM. ON INTERIOR AND INSULAR AFFAIRS, 94TH CONG., 2d SESS., *STRUCTURE OF THE U.S. PETROLEUM INDUSTRY 87-89* (1976) (high degree of concentration in fuels industry).

118. See *Resource Hearings*, *supra* note 2, at 87. For a contrary opinion, see Ikard, *Competition in the Petroleum Industry: Separating Fact From Myth*, 54 ORE. L. REV. 583 (1975).

119. See note 115 *supra* and accompanying text.

120. See, e.g., *The Capital Crisis*, BUS. WEEK, Sept. 22, 1975, at 42, 50-51 (energy industries to require \$900 billion investment by 1985).

to occur in the context of a free enterprise system.¹²¹ For these and other reasons already noted, the Bureau of Materials Statistics and Forecasting will be oriented strongly toward private industry, and will provide services of use to industry as well as government.¹²² Industry will be expected to cooperate, as largely it now does, in the gathering of information needed by the Bureau.

Beyond these joint activities there will be a stimulus to cooperation in the shared use of assumptions based on the statistical analysis and forecasting of the Bureau. These effects may be profound. It is customary for an industry to view only its own segment of the life cycle of a material; even vertically integrated companies do not usually dispose of, reclaim, or recycle the materials they extract, fabricate, and sell in the first instance. If the new Bureau can create general familiarity with the notion of a complete life cycle as a basic element of policy formation, it will assist both government and industry.

Cooperation between government and industry will be hindered if a new agency has authority to reach into the internal affairs of private enterprises to validate data or to carry out federal policy in the materials area.¹²³ An agency with more limited capacity than that proposed here will be of little importance to private industry or industry-government relations.

F. *Clarifying Consumer Choices*

A materials information system will not have any direct impact on purchasing behavior, but the information it generates may have indirect effects. Public awareness of resource and energy costs is rising. These costs may further influence consumer choices, although the effect of such information is likely to remain small in absolute terms. A consumer protection agency, if one is established, and private citizens' groups will draw on whatever materials information is made available by a new agency, and this information will reach the consumer through such groups. Use of the system by individual consumers will not be large.

G. *Overall Economic Impact*

It seems safe to predict that an improved materials information

121. See note 105 *supra*.

122. See notes 105-16 *supra* and accompanying text.

123. Interviews and questionnaire responses, *supra* note 17.

system like that proposed here will improve the functioning of the economy to some degree. In a free market system, prices are the main source of information to both buyers and sellers, producers and consumers, but prices do not reflect shortages until they have already emerged. Smaller firms may be unable to make their alternative products known, and they may not be able to identify the demand for alternative products. The large investments, extensive research, and protracted leadtimes typical in the materials field require extensive long-range planning. This planning must rest on information not yet reflected in prices, information that may be beyond the resources of even the largest firms, and that is certainly beyond the capacity of small ones. For all these reasons, any national information system should facilitate planning, enhance competition and the development of substitutes, and increase efficiency and recycling to forestall shortages.

VI. SOCIAL IMPACT

Changes in government materials information systems may have effects on society beyond the economic impacts already discussed. Some possible effects on society have already been mentioned.¹²⁴ A new materials information system, if successful, should help to advance a number of goals sought by government. To the extent the new system facilitates the work of managers and policymakers, it will also benefit the public. The general public will have greater access to the information on which policy is based, and thus may find it easier to participate in the processes of government. It is possible, of course, that the general public is already saturated with information and that any new source of data will simply increase the present overload.¹²⁵ The proposal put forward here is designed to bring greater order to existing information, with the hope that it will ease the problem of information overload, a problem now complicated by the inconsistent ways in which data are gathered, classified, and aggregated by fragmented and dispersed agencies in government and industry.

Another possibly negative result of increased information involves the invasion of privacy. As noted earlier, we do not believe the proposed Bureau would significantly decrease personal privacy or invade

124. See, e.g., notes 83-90, 99-103 *supra* and accompanying text.

125. See, e.g., Miller, *Information Input Overload and Psychopathology*, 116 *AM. J. PSYCH.* 695 (1960). Cf. D. EASTON, *A SYSTEMS ANALYSIS OF POLITICAL LIFE* (1965).

the realm of proprietary information.¹²⁶ A more powerful agency or commission, however, with authority to gather data directly and to validate them, might present dangers in this regard.

In general, therefore, we believe the principal social impact of a new materials information system of the kind proposed will be benign, and will result largely in an enhanced ability of private and public institutions to carry out expressed goals democratically. In a complex and highly integrated society like ours, however, any large-scale activity is likely to have impacts outside the scope of its immediate intended effects. The following three areas are suggestive of the less direct impacts the proposed Bureau might have.

A. *Interest in Alternative Futures*

Interest in the technique of projecting alternate futures is becoming more widespread.¹²⁷ Such interest began in academic, professional, and research circles, but is now quite general. The federal government has begun to pay more attention to the analysis of future options, and several states have established commissions or committees to conduct analyses or lead discussions of alternative futures for states or regions.¹²⁸ An integrated materials information system could have a significant impact on government and private efforts to design and choose among alternative futures. The proposed Bureau of Materials Statistics and Forecasting would provide projections into the future as part of its responsibilities. The Bureau's organization of data into manageable forms, particularly in compilation of life-cycle information for various materials, may facilitate the preparation of alternate future projections as part of the general policy formation process.¹²⁹

126. See notes 56-81 *supra* and accompanying text.

127. Earlier intuitive efforts to anticipate the future, as in the Hudson Institute's scenarios, have now been superseded by purportedly scientific approaches involving panels of experts. See R. AYRES, *TECHNOLOGICAL FORECASTING AND LONG-RANGE PLANNING* (1969); O. HELMER, *SOCIAL TECHNOLOGY* (1966) (Delphi technique of forecasting developed at RAND Corporation). Concerning mathematical models sufficiently complex to require computer calculation, see J. FORRESTER, *WORLD DYNAMICS* (1971); D.H. MEADOWS, D.L. MEADOWS, J. RONDEROS & W. BEHRENS, *THE LIMITS TO GROWTH* (1972).

128. Interview and questionnaire responses, *supra* note 17.

129. The need for alternate futures projections on materials is generally discussed in Wood, Lamb & Larsen, *supra* note 16, at 382-88.

B. *Media Treatment of Materials Problems*

Media reporting of materials-related national affairs continues to grow but is often marked by a lack of depth and sophistication. The news media is the principal source of information to the public, and frequently defines the issues which are to be the subject of public debate. A new materials information system is not likely to have any great direct impact on the daily press, because reporters usually obtain their information from officials and recognized experts, rather than from primary data compilations. Specialized media, particularly special-interest magazines, may make more direct use of the output of a materials information system, but such media are already likely to use existing data sources within their area of concern. Direct impact on the media is therefore likely to be small.¹³⁰

Indirect impacts may nevertheless be substantial. The creation of an agency, with its consignment of new officials and experts, will give materials questions more visibility, and will provide a new group of news sources for reporters. Moreover, the Bureau may improve the quality of reporting by providing a conceptual framework for organizing scattered data. The life-cycle concept is such a means which, if picked up by the media, could lead to a new organizing principle or framework for materials-related programming.

C. *Public Understanding, Education and Curriculum Development*

Public understanding of materials-related problems depends in part on the information transmitted by the communications media, and in part by the activities of public-interest action which may have a considerable effect on the perceptions and knowledge of their members. Over the long term, the general understanding of these issues will be greatly influenced by public and private schools.

The impact of a new materials information system on teaching and curriculum development may be direct and profound.¹³¹ Textbooks and other teaching aids will include materials newly available from the system. As in the case of the media, indirect impacts may be most important: the forms of organization of information by the proposed Bureau may influence the ways in which subject matter is organized

130. Interviews and questionnaire responses, *supra* note 17.

131. *Id.*

and taught. The new visibility of materials issues and the more manageable, useful form in which the data become available may have general effects on all the institutions through which the public is informed.

VII. CONCLUSION

Government requires reliable, adequate, concise, and timely information on which to base its decisions. Such information is all too often unavailable.¹³² An example of this general problem is the inadequacy of present materials information systems in the Departments of Commerce, Interior, and Agriculture, and in the Federal Energy Administration. Shortcomings in present materials information systems limit the ability of Congress and executive agencies to establish and carry out public policy. The many governmental information services, in addition to their individual shortcomings, are not organized or managed as a coherent system. Deficiencies result not so much from a lack of data as from inadequate information management, ineffective systems integration, and insufficient analysis. In light of the growing importance of materials issues and the role of public policy in dealing with them, an improved system is required to permit policymakers to test more adequately the effects of likely shortages. Current information systems will not evolve into effective tools of policymaking. Positive steps are needed to bring about the necessary improvement. The range of possible actions extends from a modest referral service-clearinghouse for coordinating existing agencies to a new, independent commission with extensive authority to collect and verify information from private sources.

We propose legislation to create a new Bureau of Materials Statistics and Forecasting. This Bureau would lie at about the midpoint of the range of institutional options for improving materials policymaking. It would perform referral and clearinghouse services; coordinate federal data gathering and aggregation; create a single comprehensive computer data base from which it would meet requests for information; pre-

132. See, e.g., J. SALOMA, *CONGRESS AND THE NEW POLITICS* ch. 7 (1969); Hopkins, *Congressional Reform: Toward a Modern Congress*, 47 *NOTRE DAME LAW.* 442 (1972); Lamb, *Judicial Policy-Making and Information Flow to the Supreme Court*, 29 *VAND. L. REV.* 45 (1976); Miller & Barton, *The Supreme Court, The Adversary System, and the Flow of Information to the Justices: A Preliminary Inquiry*, 62 *VA. L. REV.* 1187 (1975).

pare statistical reports; conduct analyses; and make forecasts concerning the full life cycle of most key materials in use. To carry out its purposes the Bureau would develop a summary data base of materials information, compiled from data already being collected by federal agencies.

An agency of government with more extensive authority than the one proposed is likely to generate significant conflicts with existing agencies and private parties. Its undesirable impact might be considerable, and not justified by the modest increase in reliability or comprehensiveness of data attributed to its extensive authority. A minimal referral service or clearinghouse agency would have a less negative impact, but would be unable to meet the present need for a coherent overall view of materials supply and demand for the present and future.

This article has reviewed the impact of a new Bureau of Materials Statistics and Forecasting, comparing it with the impact of more limited and extensive proposals. We conclude that the Bureau's benefits, as weighed against its costs, make it the most acceptable alternative for legislative action.

