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COMMITTEE PRINT

SUMMARY OF THE ENERGY CONSERVATION AND DEVELOPMENT RECOMMENDATIONS CONTAINED IN THE FINAL REPORT OF THE NATIONAL COMMISSION ON MATERIALS POLICY

JUNE 1973

A BACKGROUND PAPER

PREPARED BY THE

CONGRESSIONAL RESEARCH SERVICE

AT THE REQUEST OF

HENRY M. JACKSON, Chairman

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
UNITED STATES SENATE

PURSUANT TO

S. Res. 45

A NATIONAL FUELS AND ENERGY POLICY STUDY

Serial No. 93–16 (92.51)

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SENATE RESOLUTION 45

National Fuels and Energy Policy Study

This publication is a background document for the National Fuels and Energy Policy Study authorized by Senate Resolution 45, introduced by Senators Jennings Randolph and Henry M. Jackson on February 4, 1971, and considered, amended, and agreed to by the Senate on May 3, 1971.

The resolution authorizes the Senate Interior and Insular Affairs Committee, and ex-officio members of the Committees on Commerce and Public Works and the Joint Committee on Atomic Energy, to make a full and complete investigation and study of National Fuels and Energy Policies.

This document is published to assist members of the Committee and other interested parties in their understanding of the issues inherent in the formulation of a long-term National Energy Policy which assures the continued welfare of the Nation, including balance growth, safeguarding and enhancing the quality of the environment, and national security.

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MEMORANDUM OF THE CHAIRMAN

To Members and ex officio members of the Senate Committee on Interior and Insular Affairs' National Fuels and Energy Policy Study (S. Res. 45):

The National Commission on Materials Policy was created under Title II of the Resource Recovery Act of 1970 (P.L. 91–512). The purpose of this seven-member commission was to develop a national materials policy which would include a determination of:

(1) national and international materials requirements, priorities, and objectives;
(2) the relationship of materials policy to (a) national and international population size and (b) the enhancement of environmental quality;
(3) recommended means for the extraction, development, and use of materials which are susceptible to recycling, reuse, or self-destruction;
(4) means of exploiting existing scientific knowledge in the supply, use, recovery, and disposal of materials;
(5) means of enhancing coordination and cooperation among Federal agencies in materials usage;
(6) the feasibility and desirability of establishing computer inventories of national and international materials requirements, supplies, and alternatives; and
(7) which Federal agencies shall be assigned continuing responsibility for the implementation of the national materials policy.

In its final report,[1] issued on June 28, 1973, the Commission recommended a national policy that would make consideration of materials needs and the environment inseparable. In addition, the Commission urged conservation of materials through accelerated waste recycling and greater efficiency in the use of materials. The report also maintained that the goal of environmental quality requires a comprehensive system of resource recovery—a system where materials are recycled through the economy with minimal losses in matter and energy.

A major theme throughout the report was the need to strike a balance between the "need to produce goods" and the "need to protect the environment." The report suggested that one method for accomplishing this goal was to modify the materials system so that all costs, including environmental ones, are paid for by the ultimate users.

A second theme struck by the Commission was the need for a balance between the supply of materials and the demand for their use by increasing primary materials production. Conservation, recycling and greater efficiency offered one avenue for approaching this goal.

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[1] National Commission on Materials Policy, *Material Needs and the Environment: Today and Tomorrow*, Final Report of the Commission (Washington: Government Printing Office), June 1973.

Finally, the report recommended that materials policy be managed more effectively by recognizing the complex interrelationships of the materials-energy-environment system so that policies are reinforced, not counteracted.

Because the Commission's report contains a large number of significant recommendations of direct interest to the Committee's study of national energy policy, I have requested that a summary of these recommendations be prepared. The report was prepared by Dr. Daniel P. Beard of the Environmental Policy Division, Congressional Research Service, Library of Congress. I have directed that it be published at this time for the information of interested Senators and as background to the Committee's National Fuels and Energy Policy Study.

HENRY M. JACKSON, *Chairman.*

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I. ABSTRACT OF SUMMARY AND GENERAL RECOMMENDATIONS

In the fall of 1970, the Congress established the National Commission on Materials Policy under Title II of the Resource Recovery Act (P.L. 91–512) to develop a national materials [2] policy. The intent of the Congress, as expressed in the Commission's enabling legislation, was to "enhance environmental quality and conserve materials." The Congress foresaw the need to "utilize present resources and technology more efficiently and to anticipate future materials requirements of the Nation and the world." Accordingly, the Congress asked the Commission "to make recommendations on the supply, use, recovery, and disposal of materials * * *"

American history would have been quite different were it not for the initial gift of abundant natural resources and the development in time of a vigorous materials system to produce goods and services for domestic and world markets.

However, the successful exploitation of the Nation's natural resources and the prodigious use of the raw materials and energy they yielded burdened our environmental resources, particularly air and water. In the mid-1960's it became apparent that certain local ecosystems, necessary to sustain and enhance the quality of American life, had been excessively taxed. These strains, which have been viewed as the cost of our rapid growth and progress, are now national issues associated with the production and consumption of increasing volumes of raw materials and energy.

At the same time, the generation and disposal of waste became a focal point of concern. The potential for exploiting waste and returning to the economy the materials gained would turn waste into a national resource, alleviating some of the strain upon both the environment and the materials supply system * * *

The state of the Nation's economy today testifies to the flexibility of the materials-producing system in meeting past challenges in the pursuit of national goals. This impressive record gives us reason to look forward with confidence to meeting future challenges in the pursuit of newly defined national goals such as environmental quality and materials conservation.

Three summary directives for policymakers have evolved from this study, which the Commission believes will move the Nation toward meeting the challenges of securing a sufficient supply of materials while managing and conserving the physical basis of our national life.

> Strike a balance between the "need to produce goods" and the "need to protect the environment" by modifying the materials system so that all resources, including environmental, are paid for by users.

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[2] Materials, in this report, means natural resources intended to be utilized by industry for the production of goods, excluding foods.

Strive for an equilibrium between the supply of materials and the demand for their use by increasing primary materials production and by conserving materials through accelerated waste recycling and greater efficiency-of-use of materials.

Manage materials policy more effectively by recognizing the complex interrelationships of the materials—energy—environment system so that laws, executive orders, and administrative practices reinforce policy and not counteract it.

These directives are further detailed below.

Strike a balance between the "need to produce goods" and the "need to protect the environment" by modifying the materials system so that all resources, including environmental, are paid for by users.

To strike a balance between the "need to produce" and the "need to protect," it is important that environmental costs be taken into account in all aspects of the materials system. Such practices will encourage rational management and conservation of environmental resources. To prevent irreparable damage where true costs cannot be assessed, it is also important that materials extraction occur only where the ecosystem can absorb the environmental alteration or where damaged areas can be rehabilitated.

We recommend that

1.1 * * * environmental costs be taken into account in the computation of costs and benefits of any action to extract, transport, process, use, or dispose of any material, and that such principles become a basic element of legislation and administrative practices. Where appropriate, an emissions tax should be considered to implement this principle [Chapter 6].

1.2 * * * except where social benefits are paramount, the extraction or harvesting of materials be limited to areas where the ecosystem can be rehabilitated or enhanced [Chapter 6].

There is insufficient knowledge, awareness, and understanding of the basic interactions in the materials-energy-environment system. Science and technology must provide methods to measure, as an aid to prevention, the deterioration of the environment, as well as develop equipment to cope with noxious effluents.

We recommend that

1.3 * * * the Federal Government support extensive research and development on the dynamics of materials-energy-environment interplay and its effect on human, animal, and plant life. Studies should emphasize the detection of substances in low levels of concentration, their life cycles, and their chronic, additive, or delayed effects on public health [Chapter 10].

Pursue an equilibrium between the supply of materials and the demand for their use by increasing primary materials production and by conserving materials through accelerated waste recycling and greater efficiency-of-use of materials.

Growing U.S. materials demands upon the rest of the world's supply occurs at a time when other nations' demands are rising at an even faster rate than our own. Under these circumstances, common sense

dictates that the vast materials resources of the United States must play their proper role in the global supply-demand balance. Orderly development of domestic resources must therefore remain a high priority * * *

Where environmental considerations permit domestic production to satisfy U.S. requirements at prices competitive on the world market, self sufficiency should be the goal * * *

We recommend that

1.4 * * * traditional U.S. economic policy be maintained by relying upon market forces as a prime determinant of the mix of imports and domestic production subject to considerations of public policy involving the national security, health and viability of domestic materials industries, and fair competition. Where costly and dangerous reliance upon imported materials appears the outcome of existing trends, the Government must intervene [Chapter 9].

While the need for locating and producing domestic materials will grow, domestic exploration is not at present sustained or systematic enough to assure a continuing sufficiency of materials or energy. Since the private sector is the source of nearly all supply, the proper role of Government is to facilitate industry's striving to meet its responsibilities to supply materials by providing a congenial economic and institutional climate.

We recommend that

1.5 * * * to promote the search for scarce materials, the Federal Government facilitate access to public and private lands [Chapter 4B, Chapter 7].

1.6 * * * the Federal Government expedite decisionmaking in the energy-materials-environment area [Chapter 4B].

Energy is of particular concern in the context of supply. It appears that demand for fossil fuels, especially those most environmentally acceptable (natural gas and low-sulphur petroleum and coal), will exceed supply in the distant as well as the near future. We are basically in agreement with the Administration's policy as expressed in President Nixon's Energy Message, but we believe that additional consideration must be given to medium and long-term problems.

We recommend that

1.7 * * * beyond efforts to overcome the current energy shortage, the highest energy policy priority be accorded to a research and development effort to free this Nation from dependence upon fossil fuels for its primary energy needs [Chapter 5] * * *

The Commission considers resource recovery among the highest national priorities and encourages the Congress and the Executive Branch to establish recycling as an explicit national goal * * *

We recommend that

1.8 * * * an appropriate agency of the Federal Government, in cooperation with industry and the Commission on Product Safety, set consumer product standards that include improved service life, repairability, and recyclability; improve efficiency of material processing; and study the life expectancy of materials [Chapter 4C] * * *

1.9 * * * a national resource recovery system be established

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through public and private sector cooperation to achieve three objectives [Chapter 4D and 4E]:

Discourage dumping and encourage resource recovery as a means of turning waste into a national resource;

Disposers to prepare waste for recovery rather than dumping; and

Create markets for recovered materials by recycling technology, by Federal procurement policies, and by equitable tax and transportation rates for virgin and secondary materials.

Manage materials policy more effectively by recognizing the complex interrelationships of the materials-energy-environment system so that laws, executive orders, and administrative practices reinforce policy and not counteract it.

Congressional concern for effective materials management is explicitly expressed in this Commission's mandate. We have concluded that it is impossible to understand, much less solve, problems in one part of the interlocking materials-energy-environment system without recognizing that all parts of the system are interrelated. Effective materials policy management demands that policy formulation be based upon this principle. The current inadequacies of materials policy formulation can be improved upon to enhance materials system management. Changes are needed in three areas: the information base upon which policy decisions are made, the determination of how land shall be used, and the organization of the Federal Government for the formulation and execution of materials policy * * *

We recommend that

1.10 * * * an adequate, accurate, and accessible data base be compiled for materials-energy-environment policy development, with the ultimate objective of creating a computerized resource inventory [Chapter 12].

Every phase of the materials cycle, every element of the materials system, involves the use of land. Land use, in turn, is affected by the policies of a host of Government jurisdictions as well as by myriad private decisions. Demands for competing land uses are growing; the mass of land is not. Collectively, land use decisions will to a large extent affect the evolution of both the economy and the society. The impact of these conflicts and decisions on the availability, use, recovery, and disposal of materials makes obvious the need for an approach to land use planning which will protect the environment and make available opportunities to extract and use materials. * * *

We recommend that

1.11 * * * Congress adopt a national land use policy and supporting statutes' which will promote comprehensive planning for all land, both public and private, provide for evaluating land use practices, and establish criteria responsive to economic, environmental, social, and security needs [Chapter 7].

The extensive decentralization of policy planning and decisionmaking, both in the Executive Branch and in the Congress, for materials, energy, and environment problems has given rise to an ad hoc, crisis approach that to date has characterized policy development and ex-

ecution in the materials field. More than 63 executive branch organizations have responsibilities in the energy area alone. The interactions of materials, energy, and the environment are now too numerous, too subtle, and too complex to be managed effectively in such a decentralized manner.

We recommend that

1.12 * * * to achieve coordinated and integrated materials, energy, and environment policy planning and execution, the Federal Government must be organized to cope effectively with the changing interactions of the materials system. A single agency, such as the proposed Department of Natural Resources, overseen by a single Joint Congressional Committee, will facilitate such policy formulation [Chapter 11].

II. ENERGY-ORIENTED RECOMMENDATIONS

Chapter 4B—Supply

Complementary Goals for Minerals and the Environment

We recommend that

4B.1 * * * Congress specifically require compliance with the Mining and Minerals Policy Act in adopting other legislation relating to materials policy, so that the country need not be torn between the means of minimizing environmental pollution and the means of meeting material and energy demands.

4B.2 * * * the President require agencies to adhere to the Mining and Minerals Policy Act in administering their programs, just as they are required to adhere to the National Environmental Policy Act.

Legislation for Public Lands

We recommend that

4B.3 * * * U.S. statutes recognize without equivocation that final judgments on the value of publicly owned lands cannot be made until the subsurface has been explored thoroughly, and that the laws assure:

Land be used in a way that will optimize its future material contributions; and

In the future when values change a tract of land may be used for purposes far different from the present.

4B.4 * * * Congress include in its determination of land use policy a provision for undertaking a thorough study of the possibility of making private lands more readily available to exploration and development of mineral resources.

Research in Earth Sciences

We recommend that

4B.5 * * * the State and Federal governments extend support to departments of earth sciences in institutions of higher learning which have attained excellence in this field. In particular, public officials should support research in methods of material exploration, mining engineering, metallurgy, and material sciences on the same scale considered wise for other, more visible, public needs.

Tax Provisions for Depletion and Exploration

We recommend that

4B.6 * * * the Congress continue the percentage depletion provisions of our tax laws as a time-tested major incentive to discovery and development of mineral resources. These provisions should not be further reduced unless and until a better incentive system can be developed.

4B.7 * * * the total cost of mineral exploration be allowed as a tax-deductible item, as intangible oil and gas well drilling costs are today.

Legislation Governing Access

We recommend that

4B.8 * * * Congress include, in legislation governing land, permission to explore under regulations which will prevent irreparable damage to the protected areas and hold disturbances to the lowest level possible.

4B.9* * * Congress provide for:

The development of mineral properties by private industry where there will be minimal impairment of recreational or biological functions, or where plans are provided in advance to restore or improve original conditions when extraction is terminated;

Evaluation of the costs and benefits of mining development, by methods such as those used in the environmental impact statements of governmental projects; and

Strict sanctions against violation of protective regulations.

4B.10 * * * the Office of Management and Budget and other Government planning officials adjust the budgeted funds to expand the exploratory work of the U.S. Geological Survey and the Bureau of Mines, if necessary, by allowing these programs access to funds now utilized by relatively visible and costly, but less productive projects, within the general effort to expand material reserves.

International Resource Development

We recommend that

4B.11 * * * Federal agencies intensify their efforts to encourage worldwide development of resources by all means—diplomatic, financial, and educational—for the purpose of improving, through production and exchange of materials, the well-being of all people.

* * * * * * *

Financial Structure To Encourage Production

We recommend that

4B.13 * * * the U.S. Government reestablish and adequately fund a financial institution, possibly modeled after the Reconstruction Finance Corporation or the Defense Plant Corporation, which can arrange for low-cost investment capital for industry, if a clear national need can be shown.

4B.14 * * * the Government provide rules under the terms of the Sherman Antitrust Act which would permit:

Special industry groups to form joint venture corporations for the production of critical industrial materials under economies of scale that cannot be attained by individual companies, and under conditions that do not restrain trade; and

Establishment of industry-government-university consortia to engage in research on specific problems to further the national welfare.

4B.15 * * * legislation be enacted similar to that now provided for national security purposes in the Defense Production Act for procurement contracts, market guarantees, etc., to encourage the development of domestic material resources in specific instances; or the Defense Production Act itself should be amended to apply specifically to the current politico-economic situation.

4B.16 * * * the Internal Revenue Code be amended to provide for accelerated amortization of specific materials producing facilities as certified to be essential to meeting national needs.

Chapter 4C—Use

Review of the Materials Life-Cycle

We recommend that

4C.1 * * * a Government agency, possibly the Department of Commerce in cooperation with other agencies and with the Commission on Product Safety, should:

Specify improved service life, repairability, and recyclability when setting up standards for consumer products;

Find ways and means for working with industry to improve the efficiency of materials processing and product durability;

Study life expectancy of materials with respect to the burden upon the recycling and disposal system, as well as throwaway practices; and

Review the means available for Government action to improve materials economy with least interference with private industry.

Survey Needed

We recommend that

4C.2 * * * the Department of Commerce fund a comprehensive survey:

To determine losses sustained in the United States from corrosion, friction and wear, fracture, and high temperature service in the various industries, and to calculate the amount of savings that can be affected by application of established measures;

To assess adequacy of present research in these fields and to fund additional research, if necessary; and

To recommend improved methods for dissemination of pertinent data.

Interpretation of Modern Materials Technology and Federal Policies for Energy and Environment

We recommend that

4C.3 * * * the Congress stimulate and lead a continuing national discussion of the structure of the economy and the role played by built-in waste. The aim of such a discussion would be to generate and convey to all levels of society an understanding of the cost of waste and of its economic, social, and political consequences; and of measures that might be taken to eliminate wherever possible the harmful aspects of the use of materials and to preserve those that are beneficial.

4C.4 * * * the Federal Government establish, through executive order or legislation, analytical and advisory capabilities for addressing national materials policies and programs in the context of the total materials cycle and the associated energy and environmental requirements, drawing deliberately on the knowledge and experience of the Nation's technical community. To this end, a high-level Government body should be assigned to responsibility for overall coordination of the materials-related programs of the Government. Each governmental agency involved with materials should be made responsible for integrating its planning functions and programs into a national materials policy, with particular regard to supply problems, to conservation, health, safety, energy, and environmental issues.

* * * * * * *

Chapter 4E—Disposition of Waste

Solid Waste Management

We recommend that

4E.3 * * * industry dispose of waste, including mine tailings, in a manner to facilitate eventual recovery of valuable resources.

Chapter 5—Energy and Materials

Emphasis on Indigenous Sources of Energy

We recommend that

5.1 * * * the Nation's energy needs be satisfied, as far as possible, from indigenous sources.

(While the United States must rely upon imports to fill some portion of its needs, current trends must be reversed. Decreasing and preventing wherever possible actual or potentially dangerous or costly dependence upon imported materials must be the goal. Imported fuels which, a decade ago, were much lower in landed price than domestic fuels, have now risen so sharply that it is availability and not price that determines choice. The price dictates the search for domestic sources.)

Review of Foreign Petroleum Policies

We recommend that

5.2 * * * tax and other incentives that encourage exploration and development of foreign petroleum resources—or location of refineries abroad—should be reviewed in the light of the need to attract all available capital into domestic exploration and development.

Offshore Leasing

We recommend that

5.3 * * * the Government modify present bidding on offshore leases which requires costly bonuses, immobilizing cash until the bid is accepted or rejected.

Reliable Energy Sources

We recommend that

5.4 * * * careful study be given to the advisability of special treatment of foreign but accessible areas of supply that are secure, stable, and can be considered as safe as domestic sources.

Financial Support for Energy Development

We recommend that

5.5 * * * low cost loans or Treasury guarantees be provided to help in expediting coal slurry pipelines, unit trains from Western coal deposits, or construction of development platforms in the vicinity of the United States; e.g., in the Gulf of Mexico, or Newfoundland.

Joint Energy Policies

We recommend that

5.6 * * * the United States and Canada—or other Western Hemisphere neighbors—explore the feasibility of a joint energy policy based on the mutuality of economic interests of the sovereign nations; and that such a policy include:

U.S. financial assistance to develop Canadian hydroelectric power for the Eastern Seaboard;

Continued imports of oil and natural gas in excess of Canadian requirements; and

Joint exploration for new sources of oil and natural gas.

Offshore Oil and Gas Exploration

We recommend that

5.7 * * * offshore exploration for oil and gas along the U.S. coast receive prompt and comprehensive review and authorization by Federal agencies.

Incentives and Procedural Aids for Refineries

We recommend that

5.8 * * * oil companies be given incentives and procedural assistance necessary to balance new refinery capacity with increased demand for refined products, and expeditious approval of sites for operation.

Development of Low-Sulfur Coals

We recommend that

5.9 * * * a high priority be given for development of low-sulfur coals and construction of transportation facilities to move this coal to the Middle West, or to where it will be needed in a national emergency, with Government assistance, under plans formulated by the Executive level.

5.10 * * * financial incentives be provided if necessary, to equip,

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open, and modernize certain low-sulfur coal mines to serve plants which must continue to use low-sulfur fuels increasingly.

5.11 * * * the desirability and magnitude of further commitments to export low-sulfur coals from the United States be reviewed.

Health and Safety in Coal Mines

We recommend that

5.12 * * * the ongoing Congressional study of health and safety in the coal mines be made to determine how changes in procedures or cost allocation can relate the two objectives of protecting the miner and raising productivity through feasible health regulations which entail an acceptable, reduced, risk.

Land Reclamation

We recommend that

5.13 * * * Congress enact legislation to establish land use plans to guide reclamation, to require that mine operators post sufficiently large bonds to insure reclamation, and to prohibit mining where reclamation is impossible or too expensive.

SO_2 Removal Systems for Power Plants

We recommend that

5.14 * * * urgent attention be given to the applicability, feasibility, and cost effectiveness of such SO_2 removal systems as can be utilized with present power plants that cannot secure the necessary supply of low-sulfur fuel and are located in those areas where standards for stack emissions have to be tightened.

Relaxed Emission Controls for Power Emergencies

We recommend that

5.15 * * * short-term policies be adopted which will facilitate improvements to old power plants to satisfy modern emission standards and which will allow energy systems, wherein power shortages are most likely tot occur, to secure temporary relaxation of emission standards which impose a serious loss of capacity.

Conversion of Coal to Oil and Gas

We recommend that

5.16 * * * research and development projects for conversion of coal to oil and gas be expedited aggressively, so that they may be able to contribute to our energy needs as soon as feasible.

Oil Shale Program

We recommend that

5.17 * * * the oil shale program go forward with minimal delays and that development be undertaken as soon thereafter as practicable.

Speedy Centralized Decisionmaking for Energy Program

We recommend that

5.18 * * * a central point of decisionmaking on all facets of the energy program be established to remove delays laid to uncertainty on policy, cumbersome administrative procedures, or interagency conflicts, at the highest Executive level.

5.19 * * * construction of facilities with a high priority must be accelerated along with full appreciation of environmental factors that deserve to be evaluated as objectively as possible.

5.20 * * * authorizations for much needed new facilities (e.g., refineries, enrichment plants, power plants, etc.) should be expedited to meet energy requirements.

5.21 * * * public concern with siting of facilities should be met at all levels—public and private—with reasonable explanations of the issues and to assure credibility and confidence and to avoid time-consuming political and legal actions which utility managements must anticipate.

Aids for Urgent Energy Projects

We recommend that

5.22 * * * exceptional Treasury loans or guarantees be considered in the case of urgent energy projects that might still be born, should traditional sources of capital be unable to meet the escalating capital requirements for exploration, development, transportation, refining, and other energy installations (including synthetic plants). Obviously this would be justified only in cases where national interest may be threatened if the national energy program is not met.

5.23 * * * that options for public policy include an "Energy Bank" or other lending institution of last resort which could be relied upon to provide capital for emergency construction or modification of essential energy facilities.

Conservation Measures

We recommend that

5.24 * * * all forms of energy consumption be reviewed, with emphasis on passenger car use, size, and fuel economy and incentives for public transportation, urban and major intercity flows.

Research Program for Fuels

We recommend that

5.25 * * * a high priority, research program be undertaken for development and engineering of new sources of energy that would reduce U.S. dependence on fossil fuels.

Long-Range Planning

We recommend that

5.26 * * * the agency charged with overall responsibility for the Nation's energy program concentrate on exhaustive long-range planning on the societal and economic trends as they will affect our needs for energy.

Special Studies

We recommend that

5.27 * * * special studies be developed by industry and Government on the following:

Guidelines for energy conservation in architectural design, through use of insulation.

Ways to save energy in the home, in transportation, and at work, particularly during peaking periods, with a view toward reducing excessive use of wide assortment of nonessential energy consuming devices and the use of public education and advertising to promote conservation.

The distinction between options that require no change in lifestyles (e.g., use of heat pumps instead of resistance electric heating systems), those that require a modest change (e.g., a 4-cylinder car instead of an 8-cylinder car), and those that require a major change (e.g., use of a bicycle instead of an automobile), so that individual choices are not circumvented. It is the decrease of excessive uses of energy during peak periods that should be emphasized.

Changes in current rate structure to encourage conservation.

The total effect of conservation measures on the economy.

Reducing the Energy Deficit

We recommend that the U.S. Government encourage

5.28 * * * building code amendments to promote extensive use of insulating materials, and, if necessary, to change heating, ventilation, and electrical standards to save energy used for heating, cooling, lighting, and other functions.

5.29 * * * public education intended to curb wasteful and nonessential uses of energy.

5.30 * * * revision of electric rates to promote energy conservation practices and to curb excessive demand during peaking periods, when power interruptions are most likely to occur. It is during these periods that nonessential uses may accentuate peak loads which force expansion of the entire system.

5.31 * * * more extensive use of coal for boiler fuel; maintenance in good order of utility boilers capable of burning coal, ready to fire-up quickly in an emergency; substantially increased use of underground gas storage, improved secondary recovery of oil, and expansion of domestic refinery capacity.

5.32 * * * assistance to each utility, having boilers with coal-firing capability, to plan for switching over to coal.

Chapter 6—Environmental Factors in Materials Policy

Establishment of Cost-Benefit Criteria

We recommend that

6.1 * * * calculations of benefits and costs associated with the extraction, transport, processing, use, and disposition of materials take full account of the value of common resource properties resulting from the effect of these actions on the environment in support of the prin-

ciple that those responsible for impairment of the environment should bear the costs of damage or repair.

6.2 * * * the principles of 6.1 become a basic element of legislation and administrative practice.

Enhancing the Environment

We recommend that

6.3 * * * except where social benefits are paramount, exploring for minerals, mining or ores, and harvesting of timber should be restricted to those deposits and areas where damage to the surface of the earth and productivity of the ecosystem can be repaired or averted or where environmental quality eventually may be enhanced.

6.4 * * * legislation be introduced in Congress directing agencies to establish environmental standards where these do not now exist and to require conformance to these standards as a condition of extraction or harvest of resources.

6.5 * * * there be continuance of comprehensive, integrated planning, with assessment and public disclosure of prospective environmental effects of all major programs and projects undertaken by the Federal Government dealing with materials.

6.6 * * * there be encouragement of such planning by Federal governmental bodies and industry.

6.7 * * * use of systems analysis be expanded to improve knowledge of balancing pollution abatement strategies with the needs of the materials system.

6.8 * * * administrative devices be formulated to protect and enhance the environment at the optimal cost to society, taking into consideration internal as well as external costs.

6.9 * * * serious consideration should be given to the advantages derived from the use of an emission tax, with special attention given to possible variations in the effectiveness, and that other instruments such as prohibition, standards, permits, and availability of technology be employed as necessary, case by case.

6.10. * * * Government support as a matter of imperative priority extensive research and development on the dynamics of the environmental ecosystems, on the impacts on them of major human activities, and the effect these impacts will have on human, animal, and plant life, with emphasis on methods that will detect and study substances in low levels of concentrations and on studies of their life cycles and chronic, additive, or delayed effects on public health.

6.11 * * * damage to physical and biological systems from material wastes be minimized at each stage of the materials system.

Chapter 7—Land Use

Overall Land Use Policy for Nation

We recommend that

7.1 * * * Congress adopt a national land use policy and supporting statutes which will:

Promote comprehensive planning both for public and private lands;

Provide a means for evaluating land uses and institutions or practices and establishing criteria which take account of economic social values;

Recognize the responsibility of the States and local units of government to develop programs for non-Federal lands and assist States in the formulation, coordination, and implementation of land use planning policies;

Assist States to improve regional and local planning processes; and

Require coordination within the Federal Government and with the States, of Federal and federally assisted programs which significantly affect land uses.

Role of State Governments

We recommend that

7.2 * * * State governments, in cooperation with the U.S. Geological Survey, locate and determine the kind and extent of mineral deposits on land to be zoned in urban growth areas and apply this information to decisions on land uses.

7.3 * * * States use a quarrying and mining zoning classification to reserve essential mineral lands until deposits have been worked out.

7.4 * * * State and local governments develop regulations and licensing procedures to regulate truck traffic, reduce air and water pollution, set limits on noise, require visual screening, and insure progressive reclamation of the land.

* * * * * * *

Mining Laws

We recommend that

7.7 * * * Congress enact legislation to assure uniform control of surface mining by providing for basic Federal standards subject to local variations.

7.8 * * * Federal and State laws and regulations be tailored to the distinctive character of each form of surface mining and to allow for the different regional environmental factors.

7.9 * * * on Federal lands, the agency responsible for management of the surface land resources should have responsibility for supervision and enforcement of requirements for surface reclamation and protection of other resources.

7.10 * * * the Federal Government survey, identify, and evaluate the sources and effects of environmental pollution and safety problems associated with surface mining.

7.11 * * * the Federal Government undertake coordinated research on short- and long-term impacts of surface mining on land management and use for both private and public lands, and strengthen current programs by:

Expanding research on effects of surface mining on other resources and methods of restoring mined sites;

Providing a properly balanced, well constructed program of applied research and demonstration of mining and mine reclamation methods; and

Applying knowledge gained to criteria and standards so as to assure rapid application of the results of research.

7.12 * * * Federal agencies with expertise in land use planning, soil science, vegetation management, erosion control, and reclamation of disturbed land cooperate with States, local governments, landowners, and mining companies by exchanging technical information and assisting them to prepare plans for coordinating surface mining with other uses of the land.

7.13 * * * rights to publicly owned minerals be canceled if the holder is found to be in substantial violation of the Federal mining laws or regulations governing public lands.

7.14 * * * land management agencies be notified when and by whom rights to mineral estate are initiated and when such rights are transferred, relinquished, or terminated by operation of law and that agencies be notified also in advance of substantial disturbance of the land.

7.15 * * * title to the surface estate not transfer automatically with title to mineral estate if the mineral estate is to go into private ownership.

7.16 * * * lands for surface works and installations, other than those required for entry to mineral deposits, be paid for at fair market value if allowed to go into private ownership.

7.17 * * * the law set reasonable requirements for development of mineral property or for payments to the Government in lieu of development.

7.18 * * * the law should not distinguish between kinds of mineral property as it now does for placer and lode mining claims under the General Mining Law.

7.19 * * * mineral rights terminate at the surface property boundaries, extended vertically in depth (elimination of extralateral rights), and that mineral property be described as far as possible by legal subdivisions of the land surveys.

7.20 * * * all requirements for the inception and continuity of rights to minerals in the public lands be set solely by the Federal Government.

7.21 * * * the Federal land managing agencies be granted full authority to regulate and administer the environmental aspects of ore finding, development, and production on the public lands.

7.22 * * * royalties be collected by the Government on values yielded from publicly owned minerals.

The Leasing System

We recommend that

7.23 * * * Congress review mineral leasing laws with the objective of consolidating them into a single act, incorporating standards for coordination with other land values and uses, environmental protection, and reclamation of disturbed land where feasible.

7.24 * * * the agency responsible for management of the surface resources of the land should have the right of consent to prospecting permits and leases, including the terms and conditions for environmental protection and coordination of mineral exploration and de-

velopment with other uses of the land; and that supervision of the surface management and restoration measures be delegated to the agency responsible for the management of other surface resources.

7.25 * * * the leasing system be continued for all minerals on acquired lands and the public domain lands in Kansas, Nebraska, Missouri, Minnesota, and Wisconsin.

7.26 * * * Congress amend the Materials Act to define as precisely as possible the mineral materials subject to sale under this Act.

7.27 * * * all mineral interests reserved by the Federal Government, where title to the surface is in non-Federal hands, be placed under the Mineral Leasing System.

7.28 * * * Congress provide authority for sale of the Government's mineral interest to the surface owner, at fair market value, upon a determination that the land is not valuable for minerals, and that authority be provided to sell valuable mineral interests at appraised market value where there is a clear showing of need to unite the surface and subsurface titles in order to permit development of the surface of the land, especially in areas subject to current or imminent urban expansion or in places where it would be impracticable to develop a mineral deposit.

Public Lands

We recommend that

7.29 * * * efforts to revise, update, and refine long-range, comprehensive multiple use plans for the National Forests and BLM lands should be strengthened and accelerated with opportunity for advisory participation of all concerned and interested individuals and groups including a broad cross section of the general public.

7.30 * * * Congress complete action on an organic act for the Bureau of Land Management to provide permanent authority for multiple use management of the public domain lands to be retained in Federal ownership.

7.31 * * * public land areas proposed for classification as wilderness or for other purposes which preclude or seriously restrict extraction of industrial materials should be identified promptly to protect them against piecemeal encroachment and to determine without undue delay what will be the land base for producing materials.

7.32 * * * Congress establish and conform to the principle that mineral surveys, inventories of all other resources, and land use planning be completed for affected areas before decisions are made to withdraw Federal lands permanently from production or seriously restrict exploration and economic development of their resources.

7.33 * * * all public values, economic as well as social, be evaluated before final classification of public lands.

7.34 * * * land use planning be coordinated among Federal agencies and, to the extent feasible, with planning by States and local governments.

7.35 * * * Congress and the Executive Branch provide for balanced funding or multiple use programs so that various uses are given attention in proportion to their importance and needs, as otherwise a multiple use pattern tends to become preclusive or dominant use.

7.36 * * * protective reservations by "Presumed Excutive Authority" be confined to those absolutely necessary to protect administrative

sites, developed recreation areas, research areas, and critical environmental values and be canceled if revised mining laws provide satisfactory environmental controls.

7.37 * * * executive agencies receive orders and support sufficient to complete, as soon as possible, the land transfers and land classifications authorized by the Alaska Statehood Act and the Alaska Native Claims Act.

Land for Energy System

We recommend that

7.38 * * * States expedite long-range planning for the use of land needed for power plants, transmission lines, refineries, and other facilities needed to assure essential services in an environmentally acceptable manner. This will require close cooperation with the power utilities, the oil industry, and Federal licensing agencies as they will need at least 10 years lead time for power plants and 5 for refineries.

7.39 * * * Federal and State licensing procedures be simplified to place authority to issue construction and operation permits in a single agency at each level.

7.40 * * * transmission lines be constructed with long spans, towers at heights which require little clearing, natural screening, and designed so as to have optimal esthetic value.

7.41 * * * joint use of rights-of-way by utilities be encouraged whenever uses are compatible.

7.42 * * * Congress authorize formation by interstate compact of regional commissions to obtain sites to assure effective and economical operations of fuel and power systems.

The Continental Shelf

We recommend that

7.43 * * * the Federal Government encourage orderly development of the undersea mineral resources and essential deepwater port facilities, and expedite settlement of related environmental issues with all possible speed.

7.44 * * * the Federal Government expand programs for collecting and disseminating basic geological and geophysical data in order to relate mineral development to other resources and values effectively and to evaluate leasing proposals fairly.

7.45 * * * the Federal Government, in cooperation with coastal States and associated educational institutions and industries give high priority to expanding research in the ecology of the Continental Shelf especially with respect to preventing adverse effects of mineral exploration or development as they concern marine life, recreation, and other values.

7.46 * * * all oil and gas leases contain stringent safety requirements, based on the best technology available, with strict enforcement clauses.

7.47 * * * new deepwater ports and offshore docking facilities licensed or constructed by the Army Corps of Engineers be constructed with the least possible adverse environmental impairment, and that full Federal powers be exercised to assure that these facilities are used so as to avoid oil spills or other events likely to do serious environmental harm.

7.48 * * * Congress explore the possibility of improving statutory standards for strength and safety for American tankers and requiring that foreign tankers delivering oil to U.S. ports meet the same standards.

Chapter 8—Water

Water Resources

We recommend that

8.1 * * * policy for water resources be considered in the larger context of total environmental and natural resource policy planning.

8.2 * * * the principles and standards for preparing State, river basin, and regional plans proposed under the authorities of the Water Resources Planning Act be broadened to take into account the needs and problems of the Nation's materials system, and, in particular, that such plans provide for:

Water requirements for future development of mineral resources such as oil shale deposits and coal gasification;

The advantageous location of future industrial areas and power plants; and

The augmentation of the dry season flows of rivers serving industrial areas.

* * * * * * *

Stronger Programs

We recommend that

8.7 * * * Federal, State, and private research and development programs be strengthened to:

Improve methods for the renovation and reuse of waste waters;

Improve present methods for the disposal of the waste heat presently being discharged into the Nation's waters by power generating and manufacturing plants; and

Complete, at the earliest practicable date, studies of new methods of power generation that would result in a reduction in the large and growing quantities of waste heat produced by steam-electric generating plants.

* * * * * * *

Chapter 9—International Aspects of Materials Policy

International Cooperation

We recommend that

9.1 * * * the United States join the Natural Resources Committee of the United Nations Economic and Social Council whose mission is to provide guidance to the Council in the development of materials and protection of the environment.

9.2 * * * the United States encourage the United Nations Development Program to maintain a high priority in the allocation of its funds to surveys and training programs in the field of materials development in developing countries.

Market as Determinant

We recommend that

9.3 * * * traditional U.S. economic policy be maintained by relying upon market forces as the prime determinant of the mix of imports and domestic production subject to consideration of public policy involving the health and viability of domestic materials industry, national security, and fair international competition. Where dangerous and costly reliance upon imports appears to be the result of existing trends, the Government must intervene.

Adjustment Assistance for Labor and Industry

We recommend that

9.5 * * * a temporary program of protection from imports, decreasing over a specified, limited period of time, be combined with a program of Government guaranteed loans for modernizing plant and equipment in those basic and essential materials industries whose existence is threatened by foreign competition.

9.6 * * * the administration of the U.S. antitrust laws be altered to permit mergers of firms encountering serious difficulties arising from import competition in order to sustain domestic production.

Seabed Policy

We recommend that

9.7 * * * the United States support and diligently pursue negotiation of an international agreement to establish a legal-political regime to govern uses of the ocean floor in the international seabed area.

International Investment Arrangements

We recommend that

9.8 * * * the United States exploit every opportunity to promote the following long-term multilateral arrangements:

The negotiation of formal international codes establishing both the rights and the responsibilities of foreign investors;

The creation of international insurance arrangements for investors in which all countries would assume an appropriate share of the risk; and

Agreement of the use of an international forum for arbitration of disputes between investors and the governments of host countries.

9.9 * * * In the meantime, executive agreements should be explored as an instrument to establish mutually advantageous conditions to satisfy the requirements of foreign investors concomitant with the economic development aspirations of developing nations.

Study of Subsidies

We recommend that

9.10 * * * the United States initiate in an appropriate international body a detailed study of domestic and export subsidies in industrial countries that significantly affect exports or imports. Such a study would identify important types of subsides and develop ways

of moderating their distorting effects on international trade. The scope of the study would extend to all forms of Government assistance to industry, including concessional financing of production and investment, tax incentives, and subsidized research and development.

9.11 * * * GATT rules on export subsidies be tightened.

International Resource Planning

We recommend that

9.12 * * * the U.S. Government initiate a multilateral program to collect data on past and prospective supply and demand for materials and to exchange information and views on current and prospective needs through an appropriate international body. Special studies of individual commodities could be established as circumstances warrant. As appropriate, such special studies could propose international agreements to coordinate policies on commodities.

National Security

We recommend that

9.13 * * * where problems are foreseen, the United States should:

Foster the expansion of domestic production;
Diversify sources of supply;
Develop special relations with more reliable sources;
Find substitutes or develop synthetics;
Increase the dependence of supplying countries upon continuing U.S. good will; and
Allocate existing supplies through a priority use system.

International Environment

We recommend that

9.14 * * * the United States support the right of each nation to decide for itself the quality of its own environment, encourage the conformance of the decision with the recommendations of the United Nations Conference on the Human Environment, and when feasible, work toward the establishment of equitable international standards for materials policy and environmental protection.

9.15 * * * the United States provide full information to any country regarding the quality of any potential threats to the environment as related to any practice regarding materials extraction, processing, transportation, use, or ultimate disposition.

9.18 * * * the United States encourage the requirement of environmental impact statements by international financing agencies.

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Chapter 10—Science and Technology

Research on New Sources of Energy

We recommend that

10.1 * * * the Government sponsor a massive research effort to improve the use of fossil fuels and develop new sources of energy, to

improve slurry transport of coal, to develop processes of obtaining synthetic oil and gas from coal or from such raw materials as shale and tar sands.

10.2 * * * research into fuel cell development be pursued.

10.3 * * * greater priority be assigned to efforts to develop the breeder reactor.

10.4 * * * research in high-temperature materials be accelerated.

10.5 * * * research be undertaken in economical, clean sources of automotive power for private and public transportation.

10.6 * * * the Government support extensive R&D on the dynamics of environmental ecosystems; and on the impact of major human activities and their effect on human, animal, and plant life. The R&D will emphasize the detection and study of substances in low levels of concentration, and studies of their life cycles and chronic, additive, or delayed effects on public health.

10.7 * * * development of additional techniques to repair environmental damage from surface and underground mining and similar activities, and methods for reducing pollutants from various effluents to a more desirable level.

10.8 * * * research and development be supported, with the participation of industry, on alternative efficient technologies that produce materials without undue sacrifice of environmental quality.

10.9 * * * consideration be given to such measures as:

Review of the potentially inhibiting effects of antitrust procedures on joint industry-wide research, e.g. antipollution efforts, and modification of present procedures where appropriate.

Sharing between the Government and industry the costs inherent in demonstrating, at the pilot plant level, promising developments protective of environmental quality, e.g., hydro-metallurgical processes, formed-coke production methods (bypassing the high-emission coke ovens in coke manufacture), and extension of vacuum technology in extractive metallurgy.

Cooperative ventures of the Government and industry for developing technologies, exemplified by the wartime synthetic rubber program, by the recent cooperative blast furnace research of the Bureau of Mines, by research into nonpolluting coking methods which is now being undertaken jointly by the Office of Coal Research and industry, and by the current Technology Incentives Programs of The National Science Foundation and the National Bureau of Standards.

10.10 * * * Government support be provided for studies, particularly at universities, which will stimulate rapid development of the geosciences and their application to problems of mineral exploration.

Waste Utilization and Materials Conservation

We recommend that

10.11 * * * the Federal Government cooperate with State and municipal governments and industry in developing technologies for utilizing industrial and urban waste as a source of fuel and raw materials.

10.12 * * * support be offered to universities, private institutions, and industry to further research into development of feedstocks for polymer production from renewable raw materials, and to encourage continued research into extraction of mineral values from low-grade ores.

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Technology Research and Development

We recommend that

10.14 * * * the agencies assigned substantial responsibilities in the materials and resources field be instructed and enabled to take steps to build up commensurate research and development to generate new knowledge and technology, and also to enhance the exploitation of available knowledge. Their activities should include:

In-house research capabilities sufficient to insure adequate support for their entire research and development program.

Appropriate basic research in the physical, biological, social, economic, and political sciences as relevant to materials.

Cooperation between national laboratories and industry, including shared research, personnel, and information.

Sponsorship of coupling programs involving the Government, industry, and nonoprofit and university laboratories in joint research and development directed at serving national needs.

Deliberate, explicitly funded efforts on the part of agencies generating new technology to alert the public to the potentials of applying this knowledge and to stimulate its transfer to industrial use.

10.15 * * * a continuing analysis be carried out, preferably by NSF, of the numbers of graduates to be needed by the materials industries in various specialties, with allowance for sufficient lead time.

* * * * * * *

10.17 * * * cooperative efforts be fostered among Federal, State, and local agencies, private industry, and labor for the development of uniform national codes. These standards should be based upon performance requirements designed to increase efficiency in the use of materials, to encourage introduction and acceptance of superior materials, and to enhance recovery or disposition of materials from worn-out products.

10.18 * * * the Government review present policy with respect to the vesting of patent rights when undertaking joint research with the private sector.

Chapter 11—Organization for Government Action

Overall Agency for Natural Resources

We recommend that

11.1 * * * a comprehensive Cabinet-level agency be established for materials, energy, and the environment along the lines of the proposed Department of Natural Resources.

11.2 * * * there should be a joint committee of the Congress having legislative jurisdiction roughly parallel to the program responsibilities of the proposed natural resources agency so that the laws emerging from the Congress will not impose conflicting policies on the Government, as many such laws do today.

11.3 * * * a temporary Natural Resources Coordinating Committee be established on an interim basis at the highest policy making level, to begin the task of integrating materials, energy, and environment policy.

11.4 * * * the regulatory Commissions, to the extent necessary for coherent policy development, be brought into direct association with our proposed organizational structure.

Chapter 12—Inventories of Materials

Minerals Inventory System

We recommend that

12.1 * * * as an immediate step toward a national minerals inventory system, a national computerized mineral inventory be organized under control of the Department of Interior, until a comprehensive Department of Natural Resources is established.

12.2 * * * a qualified staff be permanently established for the interpretation and testing of the accuracy, reliability, timeliness, and completeness of the data and its adequacy for policy decisions.

12.3 * * * the mineral inventory system include economic, technological, environmental, and social elements that influence the availability and utilization of resources.

12.4 * * * the mineral inventory system, where practical, be installed on existing computer facilities not being used to capacity.

12.5 * * * the mineral inventory system incorporate those existing systems (Computerized Resources Information Bank; Mines, Energy, Resources, Information, and Transportation; and Minerals Availability System) to a degree practicable without unduly impairing operation of these programs.

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