TASK THREE: CONSERVATION OF ENERGY IN MATERIALS PROCESSING

A. TERMS OF REFERENCE

There is an increasing recognition that a national energy policy need be compounded from considerations of national self-sufficiency, environmental concerns, and retention of economic advantage in international commerce. How important a role should conservation play in that policy, and more particularly, what is the proper emphasis to be placed on conservation in the production of materials?

Rationale

Sharp drops in the historic growth rate of energy consumption were noted in 1974 and 1975 as a result of patriotic concern, reaction to increased gasoline, fuel oil, and electricity costs, and an overall recession. In 1976 energy consumption has returned to its old trend line fueled by what the New York Times has called a "Bicentennial Driving Binge" and some improvement in industrial activity.

Nonetheless, the long-term concerns inspired by the events of 1973 are a proper business of policy makers, Can energy sufficiency adequate to an independence of action in international politics be reestablished without material changes in lifestyle? Or need we prepare ourselves for a declining standard of living or greater accommodation to outside forces than we would prefer to face?

In addressing national energy policy, the chemical industry has sought to develop positions in each of three areas which, taken together, are conceived to represent definition of an energy policy; i.e., Conservation, Wise Use of Resources, and Additional Indigenous Fuels. The national policy focus is increasingly on conservation, and it would seem particularly on conservation of energy and materials in industrial production, This is understandable, in that industry uses about 41 percent of primary energy (1970), and the chemical industry uses one-fifth of that. Industry is more organized into large entities subject to definition and discipline than, for example, households are, and already motivated by changing costs to address the issues involved. One authority cites two ways to make savings:

- Use of heat that otherwise would be thermal waste;
- By making industry less energy intensive; i.e., changing the weighting of the product mix to make things which are more durable.

Questions

1. How should we define' 'conservation" for purposes of a fruitful study? Should it be "continual progress in reducing the energy consumed per unit of output (or GNP) ," or should it include consideration of reduced consumption of particular fuels in short supply, and/or changes in product character which lead to longer product life and/or otherwise reduced consumption?
2. The electrical system is the onIy present vehicle for delivery of renewable resources (solar, geothermal, tidal, fusion), and the major one for utilization of coal and nuclear energy forms. At the point of use, electrical energy is the most efficiently used energy form. Should national policy encourage, through price or other incentives, the high-voltage, high-load-factor use of electricity?
3. What potential for reduction in energy consumed per unit of material output is theoretically possible and practically possible over the short term (1985) and the long term (2010)?
4. Will the current and future increases in energy costs adequately motivate industrial energy conservation efforts, or are mandatory national requirements a better way? That is, from the standpoint of national policy, is there a parallel between Environmental Protection and Industrial Energy Conservation?
5. What constructive changes in regulatory practices would encourage more industrial electricity self-generation in a dual cycle mode (i.e., a manner to use the heat produced as well as the electricity), yielding marked improvement in thermal efficiency?
6. What should the role of Federal funding in energy conservation be— to accelerate research into energy conserving unit operations (i.e., more efficient separation techniques); and/or to encourage retrofit of obsolete facilities?
7. What should be the role of tax policy in encouraging conservation investment, or replacement of facilities with more energy conservative plants?

B. SUMMARY OF TASK FORCE REPORTS

Task Three

Group A	Group B
Points of Agreement	
Long-term energy efficiency should increase substantially but will depend on the specifics of the materials and technology yet to be applied.	Potentials for reduction of energy consumption in materials are widely variant from material to material but on a long-term basis new facilities necessary to replace energy-intensive processing such as open hearth furnaces will require 30 to 50 percent less energy.
Tax credits. tax exempt energy bonds, and quick write-offs are possible tax policles that would encourage energy conservation.	Tax policies to relieve the high cost of replacement capital equipment plus high interest rates on borrowed money and to expedite capital equipment write-offs are encouraged as incentives to energy conservation by industry.
Points of Disagreement	
National policy should encourage high load factor use of electricity y.	Use of high load factor electricity should not be encouraged for most material processing or extractive applications,
Comments	
Federal R&D funding for industrial energy conservation should be related to needs not now fulfilled by industry.	Industry in general is confused as to what the Federal policy actually is toward encouraging tbe conservation of energy. See no evidence of real. across-the-board Government-originated incentives for energy conservation at this date.
	Process analysis using material/energy balance equations familiar to the chemical engineer can point out the most energy-intensive steps that R and D efforts may minimize.
	Time demand clocks, microcomputer control of processes, adaptive control for optimizing energy of manufacturing processes, use of available waste heat for preheating precursor material, and DC power generation from thermal furnaces all have their place in energy conservation and should be encouraged.