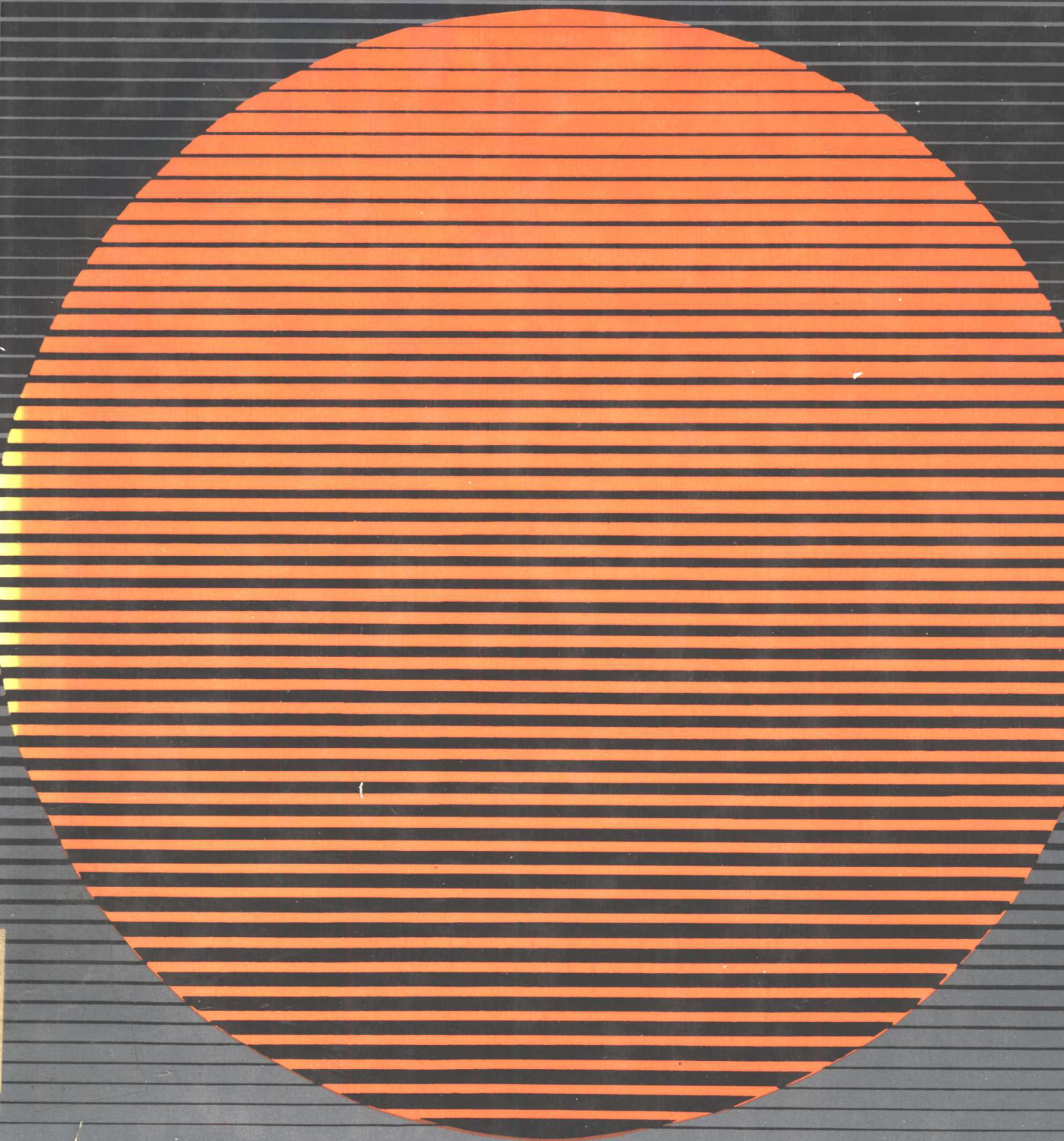
HANDBOOK OF CONSERVATION AND SOLAR ENERGY

Trends and Perspectives



V. Daniel Hunt

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Trends and Perspectives

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To my family

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Preface

The increasing scarcity and cost of energy in the United States coupled with our increasing dependence on foreign sources of petroleum threaten our economic prosperity, increase inflation at home, weaken the dollar abroad, and constrain our foreign policy options. In short, they threaten our national security. Energy conservation and the development of solar energy are important elements of our national strategy for coping with this threat both now and in the future.

Conservation, broadly conceived, is the restructuring of our market economy so that more goods and services can be produced with less energy. In essence, it is the achievement of economic efficiency in a new economic environment—one where energy is now scarce and expensive rather than abundant and cheap as it used to be. Conservation encompasses the elimination of waste, the investment in energy-efficient machines and buildings, and the changing of consumption patterns to reflect the true replacement cost of energy. Conservation, however, is not curtailment, and it should be distinguished from such short-term emergency measures as gasoline rationing. Rather, the savings from conservation come about because resources are employed more efficiently, especially in heating and cooling buildings, in powering cars and trucks, and in industrial boilers, furnaces, and electric motors, which together are responsible for most of the energy use in the United States.

The long-term potential of conservation is truly enormous. By the year 2010, it will have reduced energy use by 40 to 50 percent of what it would have been if we produced the same goods and services without conservation. Why? First, as energy prices rise, it becomes cost-effective to introduce more energy-conserving practices and measures. Second, over the longer term, as the capital stock (automobiles, furnaces, manufacturing equipment, etc.) is replaced, more energy-efficient technologies will be introduced. Third, R&D can provide new energy-conserving technologies; these enhanced technologies will be adopted as capital stock is replaced and increased. On the near term, opportunities exist for retrofitting our capital stock and making our energy-use practices more efficient.

The strong interest in solar energy has resulted from recognition of its importance as an energy resource. Solar energy includes energy from sunlight, wind, biomass, hydroelectricity, and the oceans. These resources are inexhaustible or renewable, and they could provide a significant part of our future energy requirements. For the United States, solar energy represents an energy supply that is secure against oil import disruptions, and possible slowdowns in coal production or in the use of nuclear power. Furthermore, the price of solar energy is not subject to foreign manipulation. Any environmental problems associated with using solar energy are minor compared to those associated with other energy resources.

Former President Jimmy Carter established the national goal for solar energy in his national solar message of June 20, 1979, in which he said: "We should commit ourselves to a national goal of meeting one-fifth—20 percent—of our energy needs with solar and renewable resources by the end of this century." The Domestic Policy Review analysis assumed that the United States would need 95 quads of energy by the year 2000; this suggests that meeting the president's solar goal would require the annual production of 19 quads of energy from solar energy. This would increase the energy now supplied by solar sources by a factor of almost four.

Significant barriers inhibit the achievement of the conservation and solar energy potential through the marketplace alone. Politically feasible but artificially low prices cause an underinvestment in energy conservation and

solar energy. Despite phased deregulation of natural gas prices and the decontrol of oil prices, energy prices are likely to remain below their replacement value for many years to come (especially due to inadequate internalization of environmental and other social costs). Investment biases and inadequate information prevent consumers and industry from adopting cost-effective conservation and solar energy measures. Private firms are not conducting sufficient R&D because of the uncertainty of capturing its full benefits. Finally, the present United States institutional and regulatory structure hinders conservation and solar energy. An effective national strategy must involve private enterprise, individuals, and all levels of government to address these barriers.

Current legislation and ongoing funded programs will achieve less than 9.5 quads of conservation and solar energy. New initiatives are needed. The *Handbook of Conservation and Solar Energy: Trends and Perspectives* describes the current trends and perspectives for conservation and solar energy programs. However, more funding and public support are required if we are to be truly energy independent.

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