

# Current Issues in **ENERGY**

**Chauncey Starr**

*Electric Power Research Institute, California, USA*



# CURRENT ISSUES IN ENERGY

A Selection of Papers

*by*

CHAUNCEY STARR

*Electric Power Research Institute, California, USA*



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DR. CHAUNCEY STARR

## Foreword

During the years 1973 to 1978, when the ideas and views in this volume were being shaped and tested, Dr. Chauncey Starr served as the founding president of the Electric Power Research Institute, the research and development arm of the United States electric utility industry. As a new R & D organization, created to bring direction, balance and order to the sciences and technologies needed by the electric energy field, EPRI has become under Starr's aegis a focal point — the forefront of technical analysis and development — for the electric power industry.

During this same period, our whole society was becoming gradually aware that energy was no longer a mere parameter of our national health and welfare that could be treated in an *ad hoc* fashion; rather, it was the vital and central ingredient of our entire industrial structure, and of international development as well.

Accordingly, EPRI has set as its objective the planning and developing of comprehensive programs looking to the needs and technological options of the decades ahead, far into the next century. Chauncey Starr took a decisive and leading role in the structuring and direction of these programs; moreover, he exercised an intellectual leadership in sharpening perceptions of the essential issues facing us as we make decisions on the energy options that should be pursued with greatest vigor.

Each of us, in succession, while acting as Chairman of the Board of EPRI — William G. Meese, 1972 to 1973, James E. Watson, 1973 to 1975, Shearon Harris, 1975 to 1977, and Frank M. Warren, 1977 to present — has had the opportunity of working closely with Chauncey Starr. We have agreed to speak together in this foreword because we have been uniformly impressed with the depth of his analytical temper, with the force of his arguments, and with his articulation of the choices (and their potential consequences) that confront us in the electric energy field. We are glad, therefore, that these thoughtful and informative essays are now available to a wider concerned public.

The highlights of Dr. Chauncey Starr's career, his scientific, technical and management achievements, his honours and awards, are printed on page xi of this volume. They all testify to his strengths as a knowledgeable analyst of the energy concerns that confront us. We are joined in the hope that the ideas and positions developed by Chauncey Starr will prove useful in the setting of national objectives relating to energy and the quality of life — for us and future generations.

*Chairmen of the Board,  
Electric Power Research Institute*  
William G. Meese  
James E. Watson  
Shearon Harris  
Frank M. Warren

## *Preface*

The essays collected in this volume represent solid steps toward establishing a new “science of energy and society”, a science about which, up till the present period, we have developed only the most rudimentary concepts. In fact, no such science structured from cause and effect relations yet exists, though some of its elements are beginning to emerge through the smokescreens of simplistic and idealistic notions that sometimes obscure our national dialogues.

These essays take a strong footing in the history of the role of energy in the evolution of society, and develop, through the modern tools of analysis and technological insight, views on the underlying problems regarding energy and its uses. In particular, they begin to articulate the connections between energy and production processes, between energy and economic output, and hence between energy and national and global welfare, both now and in the future.

Many serious questions, and many levels of questions, are raised and examined by the author, not in an academic or philosophical fashion, but to build effective guidelines for action. The author makes clear his conviction throughout that a range of technological options must be developed in the energy field if our future is to offer opportunities for continuing improvement of the human condition.

He argues, for instance, that energy may require a special analysis, and must not be treated from a classical economic viewpoint as just another economic variable in which demand and supply are fully responsive to price. Energy, he notes, may be different than most other goods, and more a basic necessity. Socially, therefore, we must do everything possible to insure an adequate future supply to prevent disastrous shocks and readjustments.

Some of the questions addressed in the papers:

- What is the true relation of energy consumption to Gross National Product?
- What are the energy options available to our society and what will be the consequences of the choices we make among them?
- Is it true that our industrialized society is using energy less efficiently than other societies?
- Will solar energy systems be able to compete effectively with other systems in the remainder of this century?
- What energy technologies are in sight, and what lead-times are likely in their development to commercial use?
- What evidence exists to define the relationship between energy use and the quality of life?
- How can social organizations evaluate intelligently the risks and benefits of different decisions when faced with a range of choices?

This listing of some of the issues examined by the author suggests his serious intentions. All in all, the exposition of these ideas forms a reasoned study of one of the most serious problems of our era or our stage of industrial progress. It



represents, in fact, the view of a dedicated believer in technology and technological innovation as the answer to natural resource depletion; here in the late 1970s, we hear in Starr the voice of an unembarrassed believer in technology in the service of man and society. But in place of the naive belief that technology is the answer to all our problems, there is here a grasp on technology tempered by years of experience, which gives Starr's view a wholly different edge. Though he does not quite say it, Starr implies that, given the problems of our world — of its population growth, of its inexorable demand for resources — technology offers the principal means to their solution.

Technology may be, as Starr asserts, the *only* remaining unlimited resource available to man and to the kind of society he has evolved. It is this consciousness that gives these essays their grit, their determination, their unrelenting seriousness, and, ultimately, their readableness.

These essays were prepared with the invaluable assistance of members of the Electric Power Research Institute staff, including C. F. (Andy) Anderson, Dr. Walt Esselman, Dr. Chris Whipple, and Dr. Ed Zebroski.

## *About the Author*

Dr. Chauncey Starr is vice chairman of the Electric Power Research Institute, a position to which he was appointed in May of 1978, following 5 years of service as the founding president of EPRI. From 1966 to 1973 he was the dean of the UCLA School of Engineering and Applied Science, following a 20-year industrial career during which he served as vice president of Rockwell International and as president of its Atomics International Division. In announcing Dr. Starr's academic appointment, UCLA Chancellor Franklin D. Murphy noted that "by training, by experience, and by performance, Dr. Starr is a unique blend of scholar-administrator. His interests encompass the full range from pure science to applied technology of the most sophisticated sort".

He received an electrical engineering degree in 1932 and a Ph.D. in physics in 1935, both from Rensselaer Polytechnic Institute in Troy, New York. He then became a research fellow in physics at Harvard University and worked with Nobelist P. W. Bridgman in the field of high pressures. From 1938 to 1941 Dr. Starr was a research associate at Massachusetts Institute of Technology in cryogenics.

He became associated with the Manhattan District in its early days at the Radiation Laboratory of the University of California at Berkeley, and subsequently at Oak Ridge. Following World War II, at Rockwell International he pioneered in the development of nuclear propulsion for rockets and ramjets, in miniaturizing nuclear reactors for space and in developing atomic electricity plants.

He is a member of the Energy Advisory Committee of the Office of Technology Assessment; a member of the US/USSR Joint Committee on Cooperation for Peaceful Uses of Atomic Energy; a member of the Energy Subcommittee of US - Israel Bi-National Advisory Council for Industrial Research & Development; a member of the US National Committee of the World Energy Conference; a foreign member of the Royal Swedish Academy of Engineering Sciences; and an "Officer" of the French Legion of Honor in recognition of his efforts aimed at promoting and furthering understanding between France and the United States in the field of scientific and industrial achievements.

He is most concerned with the two-way relationship between technology and society, and he has tried to clarify and strengthen this relationship on campus, in the community, in industry, and on the national scene.

# Acknowledgements

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