
Introduction

Today, in major laboratories of the United States, the European Economic Community, Japan, and the Soviet Union, a new energy technology is being developed for world use. The technology is that of magnetic fusion energy, where the word **magnetic** refers to the technique of holding the fuel in place by means of strong magnetic fields. The starting fuel will be forms of the element hydrogen.

The final form or forms of this new energy source are not yet fixed. They will be determined over the next few decades, first by scientific results and Governmental research policy, and later by research and investment decisions in the private sector. The availability of magnetic fusion for use by the Nation's energy producers will depend strongly upon the technology options available and when they become available.

The purpose of this brief narrative is to foster an awareness of the publicly funded Magnetic Fusion Energy Research Program and of its progress towards establishing the base of scientific and technical information required for commercial development of fusion energy. This program, administered by the Office of Fusion Energy, is one of many research activities of the Department of Energy (DOE). The

program has now completed three decades of accomplishment.

Over the years, this program has been sponsored by DOE and its predecessors which are responsible for the National energy mission. Its evolution has been a reflection of changes in time, in public priorities, and in legal mandate. But, throughout this evolution, there has remained a consistency of purpose: to seek a fundamental understanding of the fusion energy processes observed in the sun and stars; to establish the body of theoretical, experimental, and engineering knowledge necessary to use these processes to generate energy.

The story of this research program is told through its accomplishments. Several of the more significant accomplishments have been chosen here for illustrative purposes. Following a brief review of the program's origins, evolution, and current mission, the accomplishments are grouped and reviewed in the two broad categories of fusion science and fusion technology. This is followed by a review of international cooperative research activities which are conducted to further advance the program's effectiveness. Explanatory material is woven into the story for the benefit of most readers, who will be unfamiliar with the science and technology of fusion.