

Historical Perspective on the United States Fusion Program

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Progress and Policy will be traced over the approximately 55 year history of the U. S. Fusion Program. The classified beginnings of the effort in the 1950s ended with declassification in 1958. The effort struggled during the 1960s, but ended on a positive note with the emergence of the tokamak and the promise of laser fusion. The decade of the 1970s was the “Golden Age” of fusion, with large budget increases and the construction of many new facilities, including the Tokamak Fusion Test Reactor (TFTR) and the Shiva laser. The decade ended on a high note with the passage of the Magnetic Fusion Energy Engineering Act of 1980, overwhelmingly approved by Congress and signed by President Carter. The Act called for a “\$20 billion, 20-year” effort aimed at construction of a fusion Demonstration Power Plant around the end of the century. The U. S. Magnetic Fusion Energy program has been on a downhill slide since 1980, both in terms of budgets and the construction of new facilities. The Inertial Confinement Fusion program, funded by Department of Energy Defense Programs, has fared considerably better, with the construction of many new facilities, including the National Ignition Facility (NIF).

In 1990, a Fusion Policy Advisory Committee (FPAC) of the DOE Energy Research Advisory Board (ERAB), tried to reset the program back on to a focused track to fusion power. They called for “two distinct and separate approaches, magnetic fusion energy (MFE) and inertial fusion energy (IFE), both aimed at the same goal of fusion energy production.” They said “Both MFE and IFE should increase industrial participation to permit an orderly transition to an energy program with strong emphasis on technology development.”

The Congressional budget cutting frenzy of the mid 1990s will be described, with the nearly disastrous results it had on the MFE program and the curtailment of energy-oriented IFE efforts. The mandated shutdown of TFTR and the U. S. withdrawal from ITER nearly destroyed the logic of the U. S effort. A science-oriented rationale, developed to save the program, had the unanticipated consequence of setting up the magnetic fusion technology and IFE efforts for near elimination. The role of selective Academy reviews in re-enforcing an anti-technology policy climate will be described. A 1999 report by the Secretary of Energy Advisory Board (SEAB), stating “It is our view that we should pursue fusion energy vigorously,” has been largely ignored.

Recent efforts to get the program back on track will be discussed, including the preparation of a 35-year plan, the U. S. rejoining of the ITER international collaboration and the efforts of Congress to ensure that the U S. maintain both fusion technology and IFE efforts.

Time permitting, the history of Fusion Power Associates (FPA) will be described. From its industry-oriented beginning in 1979, FPA has evolved to a laboratory/university orientation as opportunities for industrial participation vanished and the program lost its power plant development focus. FPA remains committed, however, to the view that “Engineering sciences, technology development, systems analysis and plasma sciences should all be considered essential elements in a balanced fusion effort.” [FPA Board of Directors Policy Statement]