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The Past Can Enable the Future: Fusion History Lessons for Today

Fusion is accelerating. More than ever, looking back at our history is key to accelerating our future — fusion energy for humankind.

LONG BEACH, Calif. — Fusion is hot, literally and figuratively. Its hydrogen fuel burns at a temperature of about 100 million C, and the topic itself is heating up in global discussions about energy, technology, and the future of innovation.

Fusion has become a top priority for the U.S. government. In a recent testimony [1] before the U.S. Senate Committee on Energy and Natural Resources, Secretary of Energy Christopher Wright emphasized that, “We will prioritize research that supports true technological breakthroughs, such as nuclear fusion, high-performance computing, quantum computing, and AI, which will maintain America’s global competitiveness.” This position was further supported by Dr. Darío Gil — the Under Secretary for Science at the U.S. Department of Energy [2]. Similar comments have been made by other major players — including China, the U.K. and the European Union — as they push fusion towards becoming a key part of a sustainable energy mix.

Public support for fusion is now matched by a strong injection of private capital worldwide. In the U.S. alone, the private sector is investing more than \$9 billion to demonstrate that fusion can produce more energy than it consumes — a critical step towards practical fusion power plants.

This growing enthusiasm has sparked an unprecedented acceleration in fusion research, now seen as a viable path toward compact and efficient medium-sized power plants. Reflecting this momentum, the U.S. Department of Energy recently released its *Fusion Science & Technology Roadmap* [3], aimed at building the public infrastructure needed to help the private fusion industry scale-up in the 2030s.

Achieving practical fusion remains one of humanity’s greatest scientific and technological challenges. As we push towards commercialization, remembering the lessons of the past is key — history offers guidance, helping us avoid old mistakes and build on established knowledge for a more efficient path forward.

The history of fusion is curious, from its scientific origins to the present day. The story begins in the early 1900s, when pioneering work in quantum mechanics opened the door to understanding the microscopic world and laid the foundation of nuclear physics. Soon after, experimental breakthroughs revealed the potential of nuclear fusion as a powerful energy source.

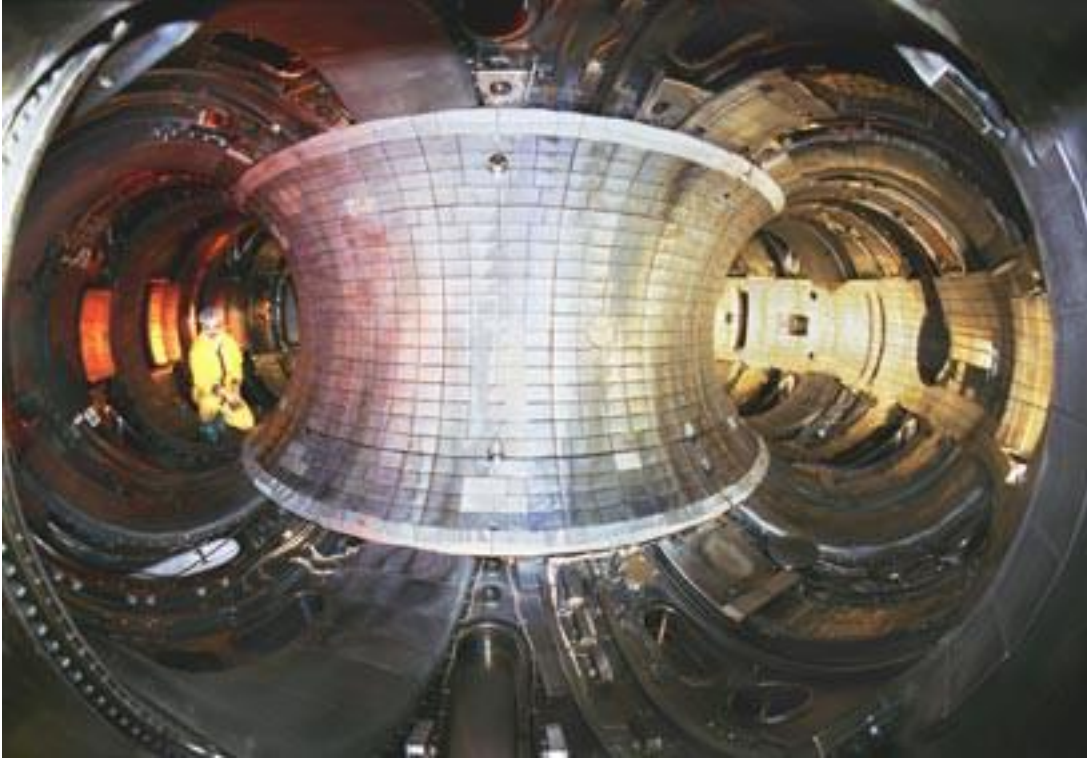


Figure 1: The USA TFTR fusion device, a milestone in the international fusion program (PPPL picture)

A pivotal moment came towards the end of the Manhattan Project, when scientists started considering the possibility of harnessing fusion energy, both for military and peaceful uses. President Eisenhower's *Atoms for Peace* speech [4] marked the beginning of international cooperation as nations started sharing knowledge on the peaceful use of fusion energy.

Since then, the field has experienced a century of progress — a mix of successes, setbacks, exploration, and renewed optimism for the future — with the United States playing a central role through a number of landmark experiments that have shaped today's science foundation.

With more than 100 years of history, fusion research has expanded enormously (Figure 1). As the field accelerates, we are entering an era of bold new visions — but also one that demands awareness of the complex challenges still ahead. Knowing our history is key to accelerating the achievement of fusion energy.

[1] <https://www.energy.senate.gov/services/files/35D195A3-946E-46D0-A5E7-84C06F46B9A4>

[2] <https://www.aip.org/fyi/doe-science-nominee-bullish-on-ai-quantum-and-fusion>

[3] <https://www.energy.gov/sites/default/files/2025-10/fusion-s%26t-roadmap-101625.pdf>

[4] <https://www.eisenhowerlibrary.gov/research/online-documents/atoms-peace>

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Abstract

[GT03.1](#)

Session

[Fusion history lessons for our times](#)

[GT03: MFE: Fusion History, Design and Optimization](#)

9:30 AM–12:30 PM, Tuesday, November 18, 2025

Room: Grand Ballroom II