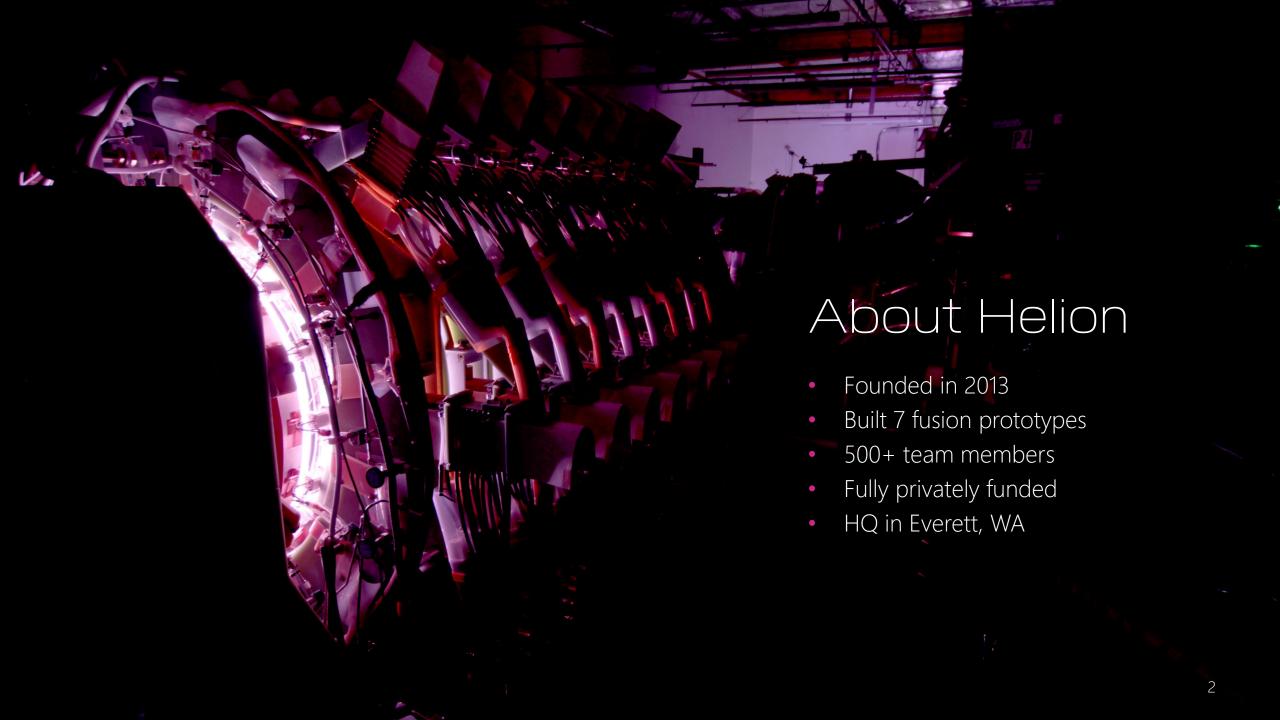
Helion Introduction and Perspective on Codes & Standards



Andrew Proffitt, Senior Director – Regulatory Policy *November 2025*



Accelerating commercialization

Helion's approach:

Pulsed

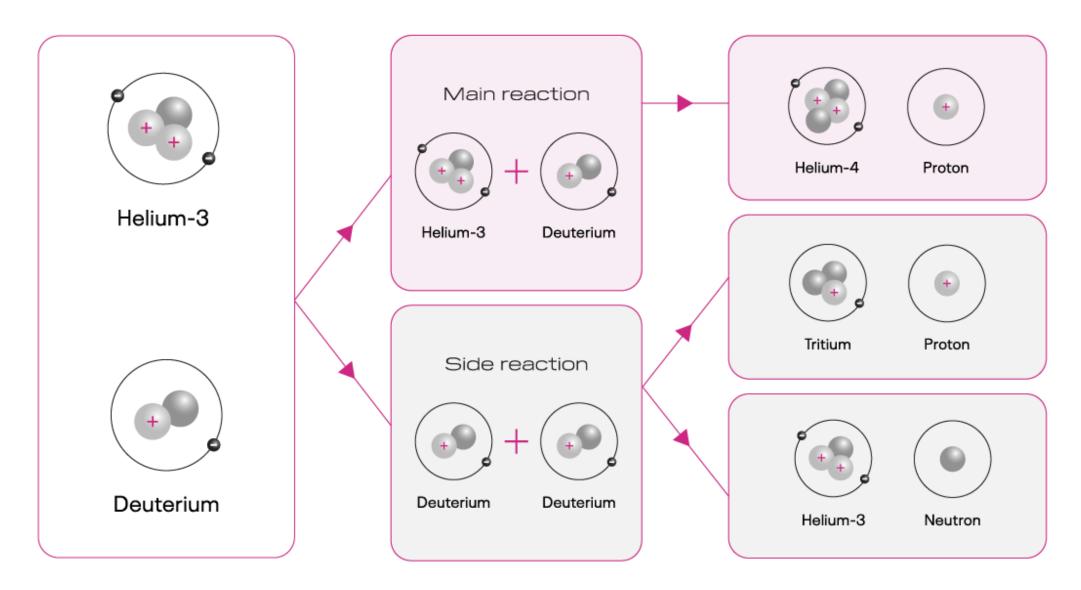
Direct energy conversion

Manufactured components



Trenta, Helion's 6th fusion prototype

Fusion produces more fuel and valuable byproducts



Formation

Deuterium and helium-3 are heated to plasma conditions. Magnets confine the plasma in a Field Reversed Configuration (FRC).

2 Acceleration

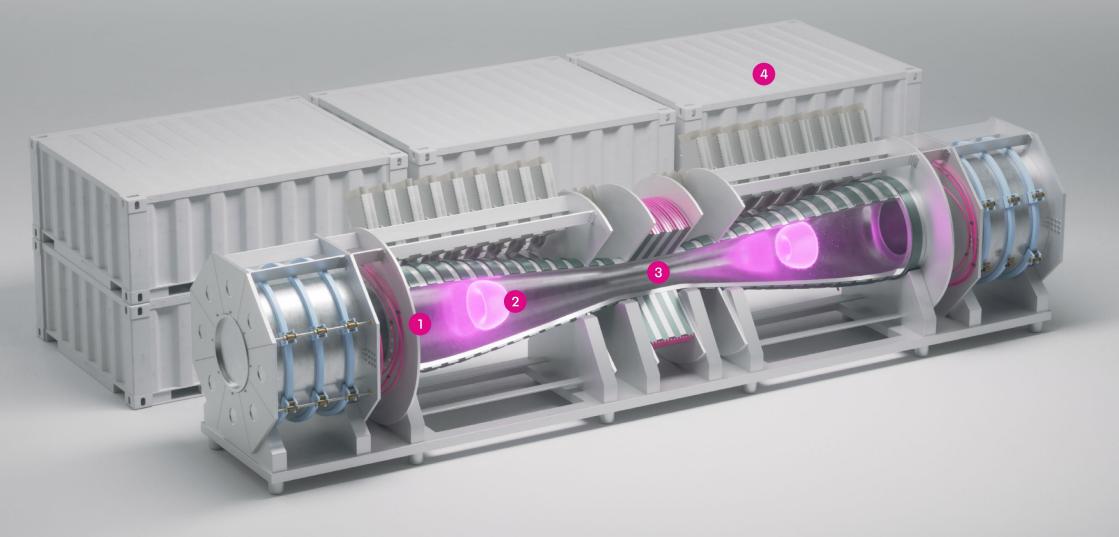
Magnets accelerate the FRCs until they collide in the center of the machine.

3 Compression

The merged plasma is compressed until it reaches 100 M°C. Fusion occurs and the plasma expands.

4 Electricity Recapture

As the plasma expands, it pushes back on the magnetic field. The change in field induces current, which is directly recaptured as electricity.

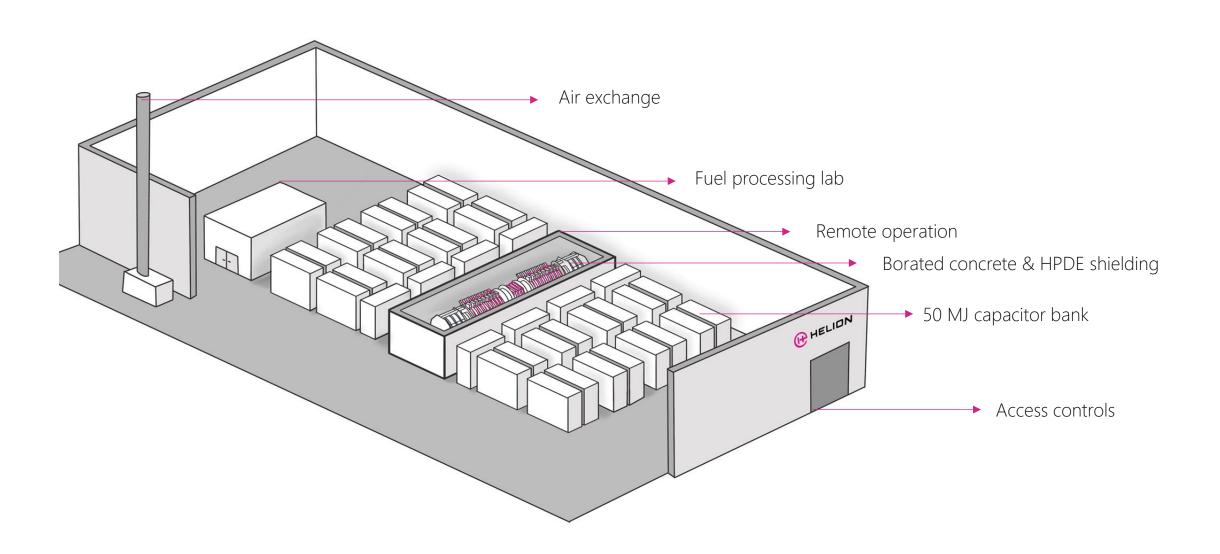


Doing fusion today in Everett, WA

- Operations began in 2024 & testing continues today
- Expected to demonstrate electricity production
- Polaris supports optimization of components for commercial systems
- Licensed by Washington state Department of Health



















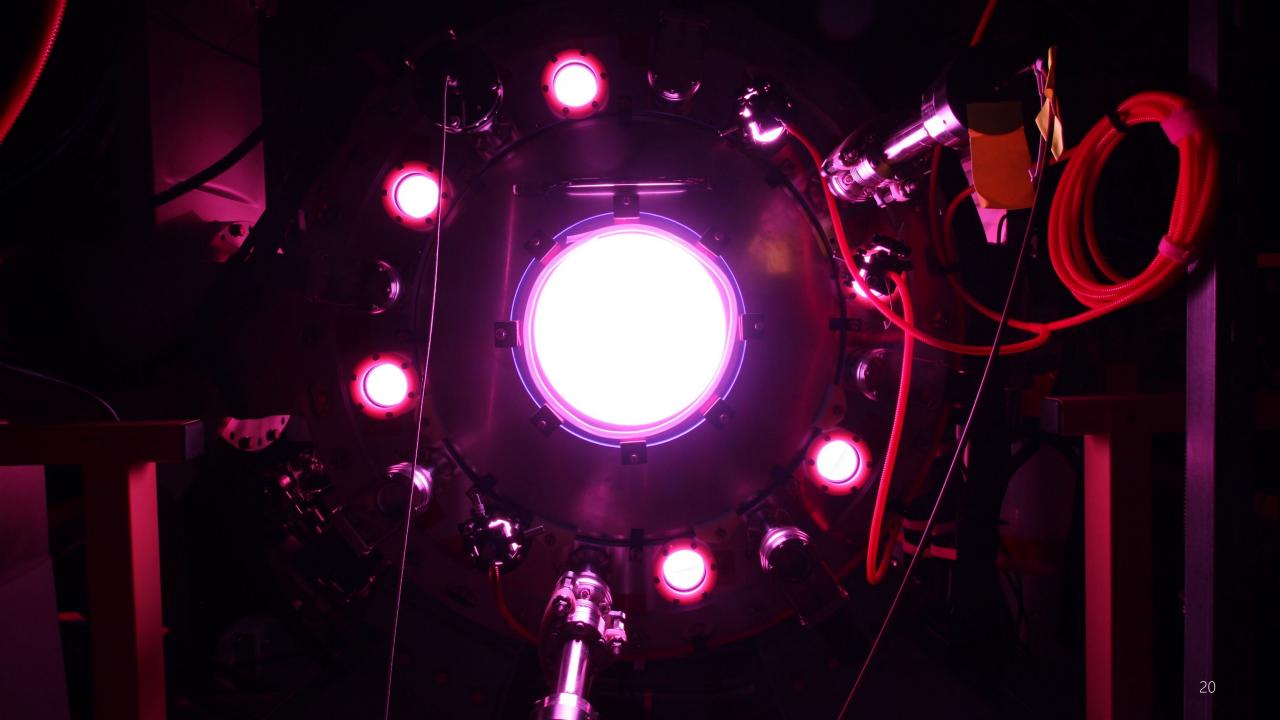












Building a commercial fusion power plant

Construction begins:

Expected completion:

• Site:

Output:

First customer:

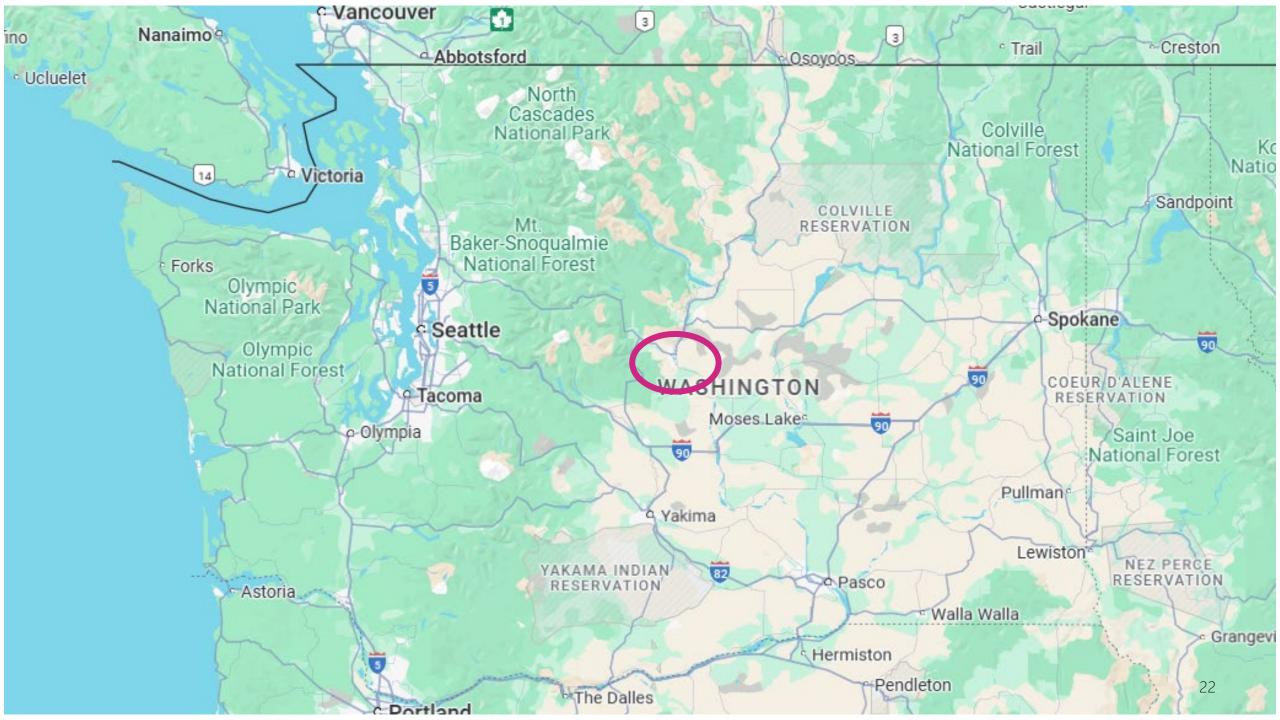
2025

2028

Malaga

50 MW+

Microsoft

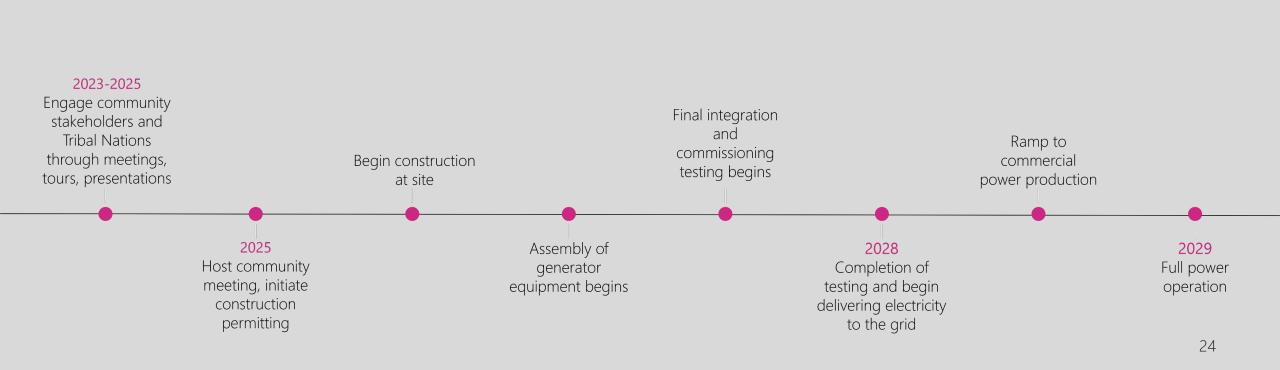




Site

Anticipated timeline:

- State environmental review completed
- Began construction in summer 2025
- Complete testing and begin operations in 2028









Looking toward the future Fusion will be mass-manufactured

 Well-suited for production and assembly on a factory line

 Do not require forging/fabrication of immense structures

Factory-built, transported, and quickly installed in industrial buildings

Once proven, capable of rapid deployment





NRC performed thorough and methodical review of fusion safety

- 2009 Asserted jurisdiction over fusion; monitor progress
- 2019-2022 Public engagement to understand potential hazards
 - 19+ public meetings with broad industry and stakeholder engagement
 - Commission briefing in November 2022
- 2023 Decision that fusion systems are not nuclear reactors
 - Regulation under NRC's byproduct material framework enabling Agreement State authority
 - Requires staff inform Commission if any future fusion system present hazards beyond those considered in the paper
- 2024 Developed draft rule language and regulatory guidance in partnership with Agreement States



Summarized characteristics of fusion machines from US NRC SECY-23-0001

- No fissile material is present, and criticality is not possible
- Fusion reactions cease without any intervention in offnormal events or accident scenarios.
- Active post shutdown cooling not necessary to maintain confinement of radioactive material
- Radioactive material in credible accident scenarios would result in low doses (less than the threshold for evacuation)
- Fusion needs active features to achieve and sustain reaction (if something breaks, fusion stops)

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January 3, 2023

SECY-23-0001

FOR: The Commissioners

Daniel H. Dorman Executive Director for Operations

OPTIONS FOR LICENSING AND REGULATING FUSION ENERGY

SYSTEMS

PURPOSE:

This paper provides the Commission with options for licensing and regulating fusion energy systems. Consistent with the Nuclear Energy Innovation and Modernization Act (NEIMA; Public Law 115-439), the U.S. Nuclear Regulatory Commission (NRC) staff is presenting these options to support the development of a regulatory framework for fusion reactors, which the NRC staff refers to as fusion energy systems, by 2027. The development of a regulatory framework is intended to provide clarity and predictability for developers of fusion technologies.

This paper considers both commercial and research and development fusion energy systems that are currently contemplated for deployment through the 2030s. As used in this paper, a "fusion energy system" refers to the device that induces nuclear fusion reactions, as well as the associated radioactive material and the supporting structures, systems, and components that are used to contain, handle, process, or control radioactive materials.

SUMMARY:

In the United States, fusion research and development activities have been carried out largely under the purview of the U.S. Department of Energy (DOE). Additional research and development have been performed under the jurisdiction of Agreement States using authority under their agreements with the NRC or using their general authority.

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> Duncan White, NMSS/MSST 301-415-2598

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Fusion specific codes and standards not required for licensing or permitting in the US



Title 10

Energy

Parts 1 to 50

Revised as of January 1, 2025

Containing a codification of documents of general applicability and future effect

As of January 1, 2025

Published by the Office of the Federal Register National Archives and Records Administration as a Special Edition of the Federal Register reliminary Draft NUREG-1556 Volume 22

Consolidated Guidance About Materials Licenses

Program-Specific Guidance About Possession Licenses for Fusion Machines

The U.S. Nuclear Regulatory Commission (NRC) is making this document publicly available for information only concurrent with the Commission's review of SECT-24-0085, "Proposed Rule: Regulatory Framework for Fusion Machines" (ADAMS Accession No. ML24019A064) except for redline-strikeout shown under the Purpose section. The contents of this document are subject to change and should not be interpreted as official agency positions.

The NRC is not seeking public comment on this document (ADAMS Accession No. ML24295A002).

If the Commission approves the publication of the proposed rule, then the Federal Register notice of proposed rulemaking will provide an opportunity for the public to submit formal comments on the proposed rule and draft guidance. Please note that any Commission approval for the publication of the proposed rule may result in changes to this document.

Office of Nuclear Material Safety and Safeguards

Helion leverages codes & standards from many common industries





American Concrete Institute

Always advancing















National Council on Radiation Protection and Measurements

Development of fusion specific codes & standards should be pursued with caution and purpose

Caution

• Avoid prescriptive adoption of codes and standards into laws, regulation, and guidance (i.e., fission)

Near-term

- Compilation of commonly used, best-practice industrial codes and standards could enable efficient design and permitting of early deployments
- Align on specific needs and initiate targeted R&D to support future code & standard development

Longer-term

- Maturation of fusion industry will result in natural convergence of approaches
- Consensus codes & standards can ease permitting burden in new jurisdictions and accelerate scaled deployment

