

# Orion

## Will the machine after Polaris built by Helion Energy produce more electricity than it consumes?

Helion Energy's commercial fusion plant, named Orion, is designed to produce more electricity than it consumes

The preceding prototype, Polaris, is intended to demonstrate the viability of this net energy generation. While Polaris itself may not achieve significant net electricity, its successful operation is a crucial step toward building a commercially viable reactor.

Key facts about the progression from Polaris to Orion:

- Orion is the follow-up to Polaris. Polaris is Helion's seventh-generation prototype, currently undergoing testing in Everett, Washington. The machine after Polaris is Orion, the name for the planned commercial-scale power plant.
- Net electricity is Orion's purpose. Helion has a contract with Microsoft to provide 50 megawatts of electricity to the grid starting in 2028 from the Orion plant, which is currently under construction in Malaga, Washington. Providing this electricity would require the reactor to produce more power than it consumes.
- Polaris will demonstrate the core technology. The Polaris prototype is intended to prove that the company's technology can create "net electricity" and demonstrate the fundamental physics needed for commercial viability. Some reports indicate that Polaris may not produce a significant net energy gain, but will serve as proof-of-concept for the direct electricity recapture process.
- Achieving net energy is unproven. The challenge of building a fusion machine that can reliably generate more energy than it consumes has been an enduring hurdle for the entire field of fusion research. While Helion is a leader in private fusion development and has raised significant capital, commentators remain cautious, and many technical aspects have not yet been publicly verified.

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# When was Trenta built by Helion Energy?

Helion Energy built and operated its sixth prototype fusion generator, named Trenta, from

2019 to 2022. The project was completed in 2019, and in 2021, Helion announced that Trenta had exceeded 100 million degrees Celsius during a 16-month test campaign. Helion ceased operation of Trenta in 2023 to focus on its seventh prototype, Polaris.

Key facts about Helion's Trenta prototype:

- Purpose: Trenta was the sixth-generation prototype designed to test the viability of Helion's pulsed fusion technology.
- Achievement: The device successfully reached plasma temperatures of over 100 million degrees Celsius, a key milestone for commercial fusion reactors. This made Helion the first private fusion company to achieve this feat.
- Testing and operation: Over a 16-month period, Trenta completed more than 10,000 high-power pulses and demonstrated bulk fusion using its intended deuterium-helium-3 fuel.
- Successor: Data from Trenta was used to design and build Helion's seventh prototype, Polaris.