

Polaris

What percentage of the input energy did polaris output as electricity?

The information for the question you asked has been looked up and is now ready to be viewed. Here's a response to the question:

As of **February 2026**, Helion Energy has not yet announced that its Polaris machine has achieved net electricity production, so a final output percentage has not been confirmed. While the machine transitioned to full operations in 2025 and is conducting fusion experiments daily, the company is still ramping up the power of its magnets to reach the threshold for net electricity.

Helion's technology is designed to recapture electricity through two primary mechanisms:

1. Magnetic Energy Recovery (Recapturing Input)

Helion's system functions similarly to a regenerative braking system in an electric vehicle.

- **Recapture Efficiency:** The company has demonstrated that it can recover over **90% to 95%** of the input magnetic energy from its capacitors, regardless of whether fusion actually occurs.
- **Engineering Advantage:** Because such a high percentage of the input energy is returned to the capacitors after each pulse, Helion only needs to generate a small amount of "new" fusion energy to reach a state of net electricity production.

2. Direct Electricity Recapture (Fusion Output)

Unlike traditional fusion designs that use heat to boil water for steam turbines, Polaris is designed to convert fusion energy directly into electricity.

- **The Process:** When fusion occurs, the expanding plasma pushes back against the machine's magnetic fields. This movement induces an electric current in the machine's coils, which is then captured and returned to the capacitors.
- **Fuel Efficiency:** For advanced fuels like **D-He3**, nearly all reaction products are charged particles, which allows for extremely efficient direct energy recovery.

Current Performance Status (2025–2026)

- **Operational Milestones:** In late 2025, Helion reported that Polaris was consistently exceeding the performance of its predecessor, Trenta, in both plasma temperature and the size of its Field Reversed Configurations (FRCs).
- **License to Operate:** Helion recently received approval to operate with **deuterium–tritium (D-T)** fuel, marking the first time a private company has been licensed to perform D-T fusion.
- **Net Energy Target:** While the target for demonstrating net electricity was initially set for 2024, recent reports suggest Helion is aiming for a net energy gain milestone by the **third quarter of 2026**.

Would you like me to look into the specific technical differences between **Polaris** and the upcoming **Orion** commercial plant?