

NUCOR AND HELION TO DEVELOP 500MW FUSION POWER PLANT

Nucor, North America's largest recycler and producer of steel and steel products, and Helion Energy, a fusion company, announced plans to develop a 500 MW fusion power plant. The plant will offer baseload zero-carbon electricity from fusion directly to a Nucor steelmaking facility. This is the first fusion energy agreement of this scale in the world and will pave the way for decarbonizing the entire industrial sector. As part of the agreement, Nucor is making a \$35 million investment in Helion.

FUSION EXPLAINED

Fusion occurs when two atoms combine to form a single atom. The combined atom has less mass than the original two atoms. In accordance with $E=mc^2$, energy is released in the process. It is the way the Sun produces energy. Fundamentally, fusion is the process that powers the entirety of our universe.

HELION'S TECHNOLOGY

Helion leverages an approach to fusion called magneto-inertial fusion (MIF). In Helion's machines, plasmas are formed at both ends of the device, then accelerated by magnets into a compression chamber, where the plasmas combine and are compressed to fusion conditions. Electricity is directly recaptured in the process.

SCIENTISTS HAVE PURSUED FUSION FOR DECADES. WHAT IS DIFFERENT NOW?

Advances in technology and increasing computer capacity are accelerating the development of fusion. Scientists theorized about an approach like Helion's in the late 1950s. However, those scientists were working in a world without transistors or modern computers and couldn't prove their concepts. Technology advancements in computers, power electronics, and nanosecond fiber-optic networking have allowed pioneering concepts to be reimaged and made a reality. Rapidly increasing computer capacity has made it possible for simulation codes to represent fusion reactions in greater detail, so predictions about performance can be made without the expense of building large experiments.

1 Formation

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

2 Acceleration

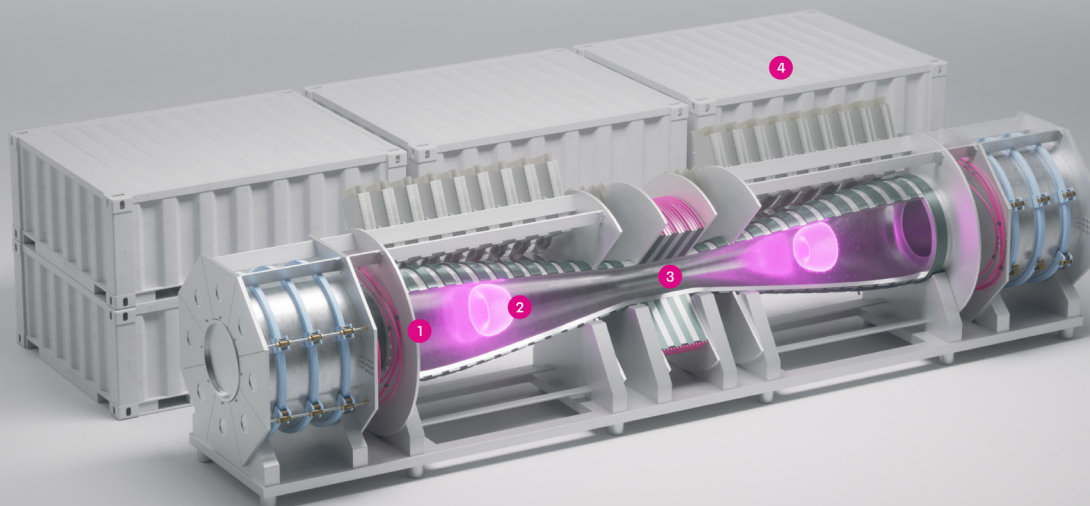
Magnets accelerate the FRCs until they collide in the center of the device.

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.



A surge in private investment in fusion research is also speeding up development. The urgent need for zero-carbon energy has increased investment by venture capitalists, traditional energy companies, the federal government and wealthy individuals. To date, there has been more than \$4.7 billion in private investment in fusion, ~\$2.8 billion of which was invested in 2022 alone.

WHY HELION?

Helion has a technology solution that allows the company to deploy commercial fusion power faster than any other fusion company. They have technical results that back up their path to commercialization, including reaching milestone fusion temperatures and operation time. Their ability to move quickly and their focus on producing zero-carbon electricity for the end user were key reasons why we wanted to work with them on a fusion power facility.

AS A STEEL COMPANY, WHY ARE YOU GETTING INVOLVED IN ENERGY?

Nucor is a large energy consumer – often among the largest in the states where we operate. We make steel by recycling scrap metal in an electric arc furnace. This is the cleanest way to make steel today, producing one-third the greenhouse gas emissions as extractive steelmaking using blast furnaces.

Today, about 40% of the electricity Nucor uses comes from clean or renewable energy sources. To get to 100% clean energy, we will need an always-on, affordable baseload source of zero-carbon electricity.

AN INVESTMENT OF \$35 MILLION SEEMS RATHER SMALL GIVEN THE SCALE OF THE CHALLENGE. IS THAT ENOUGH?

Nucor is just one of several investors supporting Helion's work. Our financial support, along with the others, will help advance the important work Helion is doing. Nucor is also an attractive long-term customer as Nucor is a large energy user that is looking for sources of carbon-free electricity. We want to be a leader in not only decarbonizing the steel industry, but the industrial sector as a whole. This is a beneficial partnership for both of us.

WHEN WILL THE PLANT COME ONLINE?

We are working together to set a firm timeline as part of this agreement. Both Nucor and Helion are committed to begin operations as soon as possible, and, as of now, 2030 or after seems like a realistic target, depending on the final site selection.

WHAT IS THE ESTIMATED REDUCTION IN EMISSIONS AT A STEEL MILL THAT DEPLOYS FUSION TECHNOLOGY?

It is estimated that if fusion is deployed at one of Nucor's largest mills, we could see a 500,000 metric ton reduction in scope 2 emissions annually.

**FOR MORE INFORMATION VISIT
NUCOR.COM OR HELIONENERGY.COM**