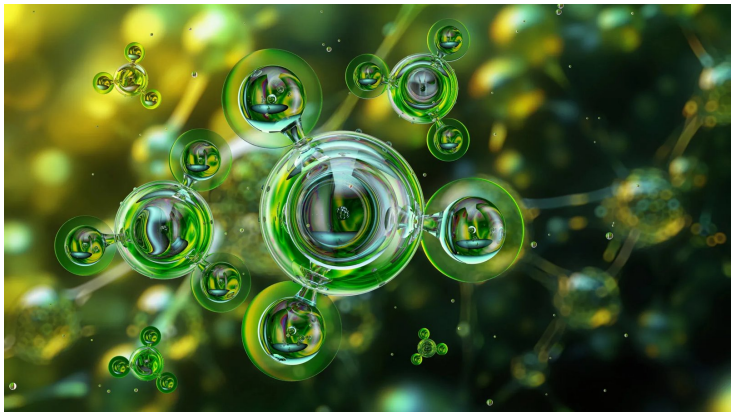
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U.S. startup thinks it can make green ammonia cost-competitive

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Faraday Earth is using plasma technology and artificial intelligence to lower the cost of low-carbon ammonia, potentially reshaping fertilizer production and the future of sustainable agriculture



The global race to decarbonize ammonia production is entering a new phase, with U.S.-based climate technology startup Faraday Earth claiming a significant breakthrough that could bring green ammonia within striking distance of conventional production costs.

The company says its plasma-based ammonia production platform can achieve a levelized production cost of around $500 per metric ton—a price point that approaches the economics of traditional fossil fuel-derived, or "gray," ammonia. If commercially validated at scale, the technology could remove one of the biggest barriers preventing widespread adoption of low-carbon fertilizers.

The milestone follows a recent investment from agri-food venture capital firm AgFunder, underscoring growing investor confidence in next-generation fertilizer technologies that combine clean energy, artificial intelligence and decentralized manufacturing.

Reinventing a Century-Old Industrial Process

For more than a century, global ammonia production has relied on the Haber-Bosch process, an energy-intensive technology that consumes vast quantities of natural gas while accounting for a significant share of industrial carbon emissions.

Faraday Earth is pursuing a fundamentally different pathway.

Instead of relying on extreme temperatures and high-pressure reactors, the company employs non-thermal plasma generated through high-voltage electric fields to activate atmospheric nitrogen. The activated nitrogen is then combined with green hydrogen produced through electrolysis or naturally occurring geological hydrogen sources to synthesize ammonia.

By replacing fossil fuel-driven chemistry with electricity-powered plasma, the system aims to dramatically reduce emissions while improving production flexibility.

Artificial Intelligence Powers the Reactor

One of the defining features of the platform is its integration of artificial intelligence into reactor optimization.

Rather than operating under fixed parameters, the system continuously analyzes reactor performance using a digital twin powered by machine learning algorithms. The software dynamically adjusts operating conditions to maximize nitrogen activation and improve ammonia yields in real time.

The combination of advanced plasma physics and AI-driven optimization reflects a broader trend in industrial manufacturing, where intelligent process control is becoming as valuable as the underlying hardware itself.

Decentralizing Fertilizer Production

Faraday Earth is also challenging the conventional economics of ammonia manufacturing.

Traditional ammonia plants require multibillion-dollar investments and operate at enormous scale, making production highly centralized and dependent on extensive transportation networks.

The company's alternative consists of modular, container-sized production units capable of generating several metric tons of ammonia each day. Such systems could enable fertilizer manufacturers, distributors and large agricultural operations to produce ammonia much closer to where it is ultimately consumed.

Localized production has the potential to reduce transportation costs, improve supply chain resilience and provide greater protection against disruptions in global fertilizer markets.

Agriculture's Decarbonization Opportunity

Ammonia remains the essential building block for nitrogen fertilizers that sustain agricultural productivity worldwide. At the same time, conventional ammonia production is responsible for a substantial share of industrial greenhouse gas emissions, making it a priority sector for decarbonization.

As governments and fertilizer manufacturers pursue lower-carbon alternatives, technologies capable of delivering green ammonia at competitive costs are attracting increasing commercial interest.

Faraday Earth has already moved beyond laboratory research, deploying a demonstration system, securing its first commercial customer and entering into a commercialization agreement with a major industry partner.

While large-scale deployment remains the next critical challenge, the company's progress suggests that green ammonia may be approaching an economic tipping point.

If plasma-enabled production proves commercially scalable, it could fundamentally reshape how one of agriculture's most essential inputs is manufactured—bringing fertilizer production closer to farms while reducing the industry's carbon footprint.