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GTI ENERGY

solutions that transform

HYDROGEN GENERATION

WITH INTEGRATED CARBON CAPTURE



GTI Energy is a leading research and training organization. Our trusted team works to scale impactful solutions that shape energy transitions by leveraging gases, liquids, infrastructure, and efficiency. We embrace systems thinking, open learning, and collaboration to develop, scale, and deploy the technologies needed for low-carbon, low-cost energy systems.

GTI ENERGY'S HYDROGEN GENERATOR

Cost-competitive hydrogen (H₂) generation with integrated carbon capture

GTI Energy's hydrogen generator technology offers a cost-competitive solution for the conversion of natural gas to hydrogen, while avoiding carbon dioxide (CO₂) emissions. The process, based on sorbent enhanced reforming, is fundamentally different from conventional steam-methane reforming (SMR) or autothermal reforming (ATR) with carbon capture, in that it captures the CO₂ produced in the reforming reaction inherently in the process. CO₂ capture is not an additional, capital-intensive process step. This inherent capability in the GTI Energy process leads to its higher carbon capture potential, its substantially lower capital cost, and smaller footprint. The result is a low-cost pathway to essentially carbon emissions-free hydrogen up to very large scale.

The concept for a 2.3 MMSCFD (5,400 kg/day) modular demonstration plant has been defined and costs estimated for its construction and operation. The design is scalable to very large H₂ production rates (e.g., 90 MMSCFD [216,000 kg/day]) with the attendant economies of scale, with single or multiple modules.

When utilized with power generation in a combined cycle power plant, the technology provides the lowest cost of electricity for reduced carbon applications.



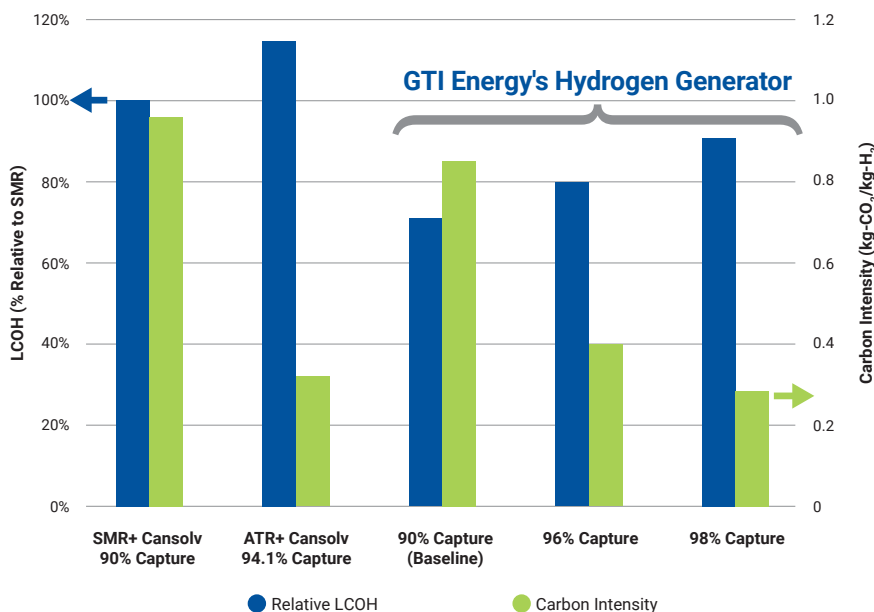
Key Benefits

- H₂ produced in one step
- Inherent CO₂ capture, eliminating amine system
- 75% footprint reduction vs SMR
- 40–50% lower capital cost vs SMR
- 20–30% lower Levelized Cost of H₂ (LCOH)
- 10–20% increased H₂ production efficiency
- Steam neutral

Applications

- Power generation with CO₂ capture and load-following if storage is included
- Hydrogen for:
 - Refineries and biorefineries
 - Infrastructure
 - Fertilizers (ammonia, urea)

Cost & Carbon Intensity Comparison of Various Hydrogen Production Methods



STATUS: GTI Energy has completed pilot testing, under U.S. DOE funding, which verified catalyst stability and successfully demonstrated Sorption Enhanced Reforming (SER) chemistry and process operation. Ongoing modifications of the pilot plant in GTI Energy's facility near Chicago, USA, will further mitigate development risks related to calciner and solids handling components. A larger pilot plant, with about 1 tonne per day hydrogen capacity, is under construction at a dedicated site at Cranfield University in the UK. In addition, GTI Energy has completed a detailed techno-economic study for U.S. DOE, confirming the cost advantage of the technology with and without CO₂ capture.

Markus Lesemann

Senior Director, Business Development
mlesemann@gti.energy, +1 847.768.0914

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1700 S Mount Prospect Road
Des Plaines, IL 60018 USA