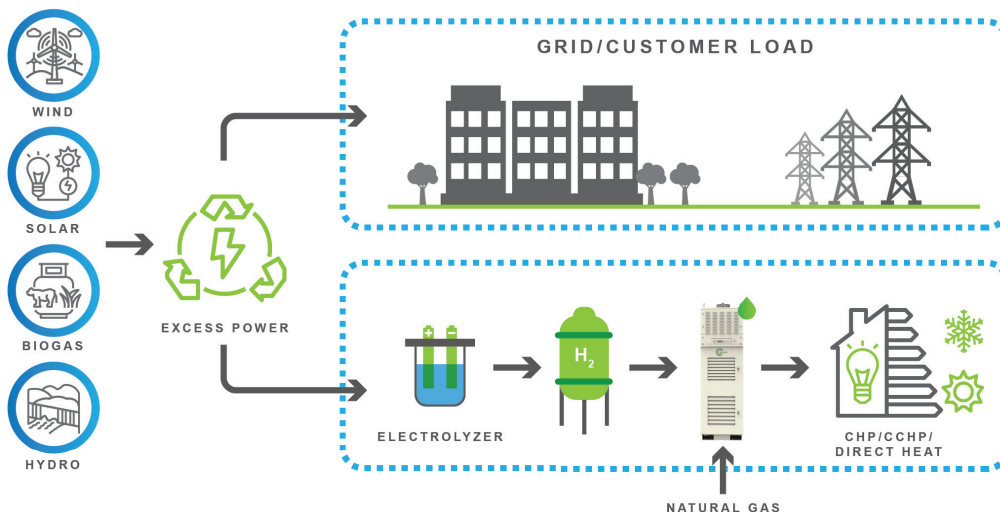


CAPSTONE TURBINE HYDROGEN MICROTURBINES

As a thought-leader in the energy sector, Capstone recognized years ago that hydrogen would play an important role as a key part of the future of renewable, green energy landscape.

Hydrogen microturbines are the perfect complement for the intermittent nature of wind and solar power, making them an ideal component of the modern clean and green microgrid. When renewable energy production exceeds demand, excess energy can be used to power the production of storable, renewable hydrogen energy. Stored hydrogen provides a convenient, high-density fuel source that can be used as carbon-free fuel for Capstone's microturbines. As a decentralized energy source, microturbines can be located on-site where hydrogen can be produced and stored locally, in advance of the need for costly distribution, which may take many years to develop.

Capstone's hydrogen microturbine product will offer a more cost competitive 100% hydrogen solution with as good or better performance and superior lifecycle costs. In addition, Capstone's industry-leading combined heat and power (CHP) capability provides further advantages compared to electric-only fuel cells as microturbines offer a source of on-site thermal energy, optimizing the return on investment (ROI) for customers. A green energy solution that provides a real return financially is a very attractive offering in today's increasingly ESG-focused world.



Green Hydrogen is made by using clean electricity from renewable energy sources to power the electrolysis of water (H₂O).

HYDROGEN FAQ

- **What hydrogen blended fuels can Capstone microturbines use?**

Currently, Capstone microturbines can be operated on hydrogen / natural gas blends. The current limit in the fuel specification is 1%, however, Capstone has been permitting up to 10% hydrogen volume blended with natural gas. Capstone has been working with the DOE Argonne National Lab (ANL) and University of California Irvine (UCI) to advance system testing. At ANL, the C65 has been able to operate on up to 70% hydrogen without modification. Additional work is scheduled to evaluate the C200, and to validate performance over a variety of environmental conditions, operating profiles, and system configurations. Syngas, which is typically a blend of hydrogen, CO, and CO₂, will also be considered as Capstone progresses to 100% hydrogen operation.

- **What is the fuel consumption rate for hydrogen to reach rated power outputs?**

Fuel consumption for a C200 system will continue to be 2400 MJ/hour as this is what is needed to produce the power. The difference will be in the mass and volumetric flow rates of hydrogen, which will govern the size of fuel delivery equipment and storage requirements, if necessary. As a rule of thumb, the mass flow rate of hydrogen will be a third of that natural gas, while the volumetric flow rate will be higher, typically at 3 times natural gas.

- **What safety measures are in place when hydrogen is all or part of the fuel composition?**

For hydrogen blends up to 10% by volume, there are no expected changes required and the system may be used as currently manufactured by Capstone. As we work with higher levels of hydrogen, we have to be conscientious of the safety aspects, reviewing fuel inlet hardware, system controls, and package ventilation. Our work with national and university research partners will provide valuable insight as industry standards and best practices are developed.

- **How does the use of hydrogen impact maintenance schedules?**

There are no anticipated changes to maintenance schedules for systems operating on hydrogen and natural gas blends. For full hydrogen operation, scheduled maintenance will be defined as part of the validation and field trial stages. To keep Capstone equipment as consistent as possible, the objective will always be to minimize the number of new components, as well as maintaining our already very minimal service schedules. However, we do recognize the challenges hydrogen presents when used in a system that operates in the many different global applications available.

- **What is the cost of the hydrogen fueled product?**

100% hydrogen systems pricing will be based on the necessary changes we determine during final design for manufacturing, but is expected to only be nominally higher due to increased need for safety and monitoring required. Hydrogen/natural gas blend systems will be built as Capstone's standard, high pressure natural gas systems. Pricing is expected to be consistent with that product line.

- **When will the 100% hydrogen C65/200/1000 be available?**

Further testing is already planned with our patented hydrogen injectors after which we expect to continue testing with greater levels of hydrogen up to 100%. The current plan has a 100% hydrogen product available for sale in the latter half of calendar year 2022.

