HYDROGEN/METHANE FUELLED MICRO GAS TURBINE

Overview

An alternative to hydrogen fuel cells for clean power generation is to use a dual fuel gas turbine with appropriate mixtures of hydrocarbon fuel and renewable hydrogen to power the gas turbine. For example, low-grade biogas can be enriched with renewable hydrogen and fed into the turbine.

Duel fuel micro turbine operation

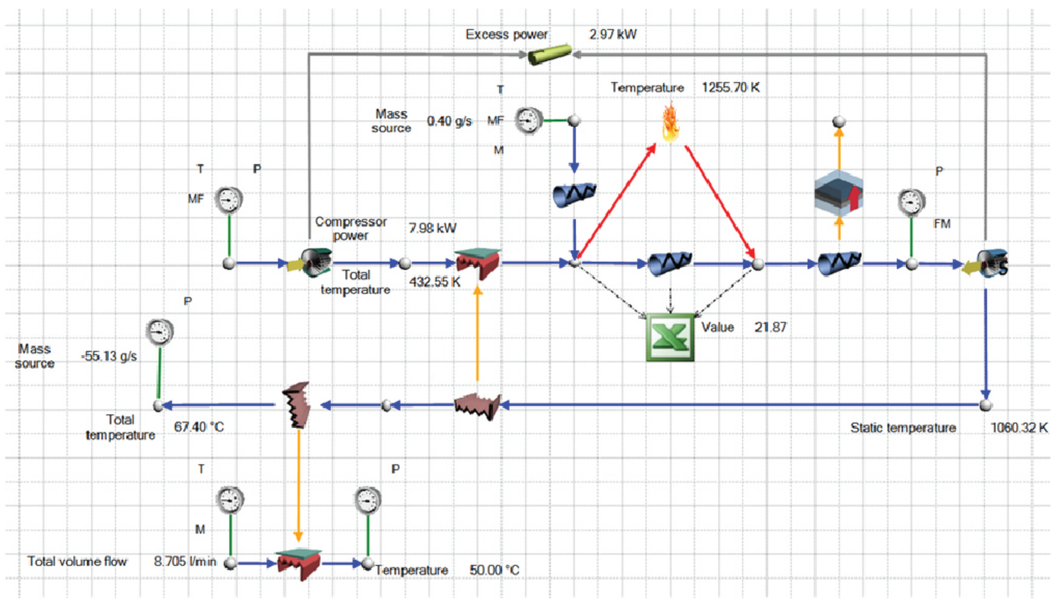
At *HySA* ***Infrastructure*** the duel fuel operation of the turbine supports cleaner combustion properties. This desirable operation is made possible by the higher combustion rate and heating value of hydrogen, and results in lower CO and NOx emissions. In addition, the heat recovered from the turbine can be used to extract hydrogen from a storage medium such as LOHC.

COMBUSTION FUEL SCENARIOS

	Pure CH_4	CH_4 / H_2	Biogas / H_2
CH_4	100%	85%	65%
H_2		15%	20%
CO_2			15%

MICRO GAS TURBINE SPECIFICATIONS

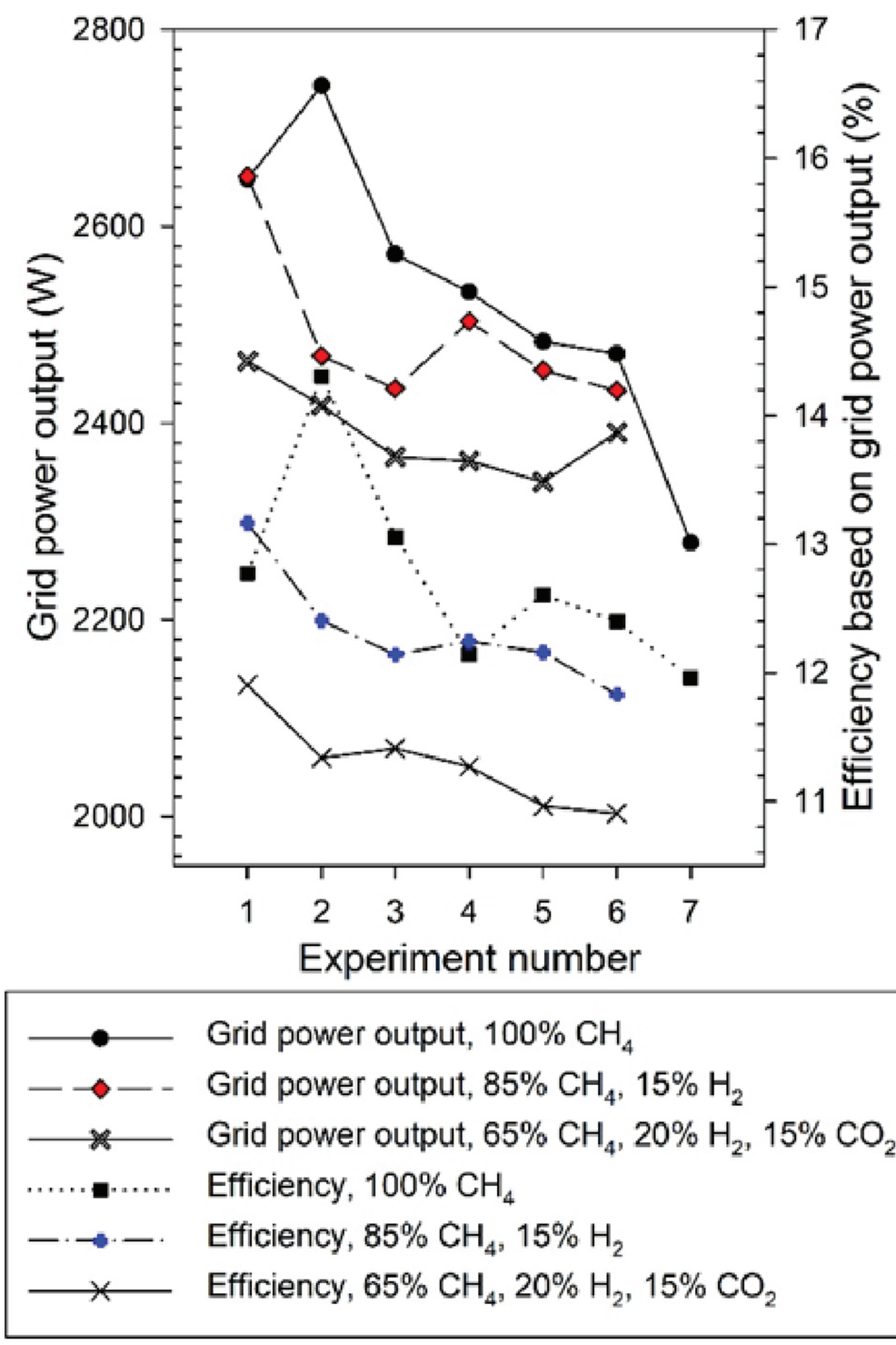
FUEL FLOW RATE	14,0 – 31,1 NL/min
TURBINE OUTLET TEMPERATURE	~790°C
NET ELECTRIC OUTPUT	1,0 - 3,0 kW_e
NET HEAT OUTPUT	5,0 - 14,4 kW_{th}



Flue gas and multicomponent trace analysis

HySA ***Infrastructure*** has the capability with a multi-gas analyser (Environnement S.A MIR9000) to quantify trace gases such as CO, CO_2, NO, NO_2, O_2 and total hydrocarbons in the ppm range. This equipment is essential to determine flue gas quality from combustion processes or trace compounds in gas streams related to hydrogen production from various sources.

The analyser measures O_2 with the paramagnetic principle, the NO_x with the chemiluminenscence principle and the CO and CO_2 with infrared and a gas filter correlation technique.



Fuel-to-grid power and efficiency from micro-turbine. With the addition of usable heat, the efficiency increases to ~70%.