Helbio

Hydrogen & Energy Systems

H2PS-5

H2PS-5 IS A COMBINED HEAT & POWER CHP SYSTEM

It has a capacity of 5 kW electric power, while in the combined heat and power (CHP) mode, it can also produce up to 7 kW thermal energy in the form of hot water.

THE SYSTEM IS MULTI-FUEL FED, IT CAN OPERATE WITH EITHER NATURAL GAS, PROPANE/LPG OR BIOGAS, CONVERTING IT TO ELECTRICAL POWER THROUGH AN INTERMEDIATE PRODUCTION OF HYDROGEN USING A PROTON EXCHANGE MEMBRANE FUEL CELL (PEM-FC).

01 Natural gas

02 LPG

03 Biogas

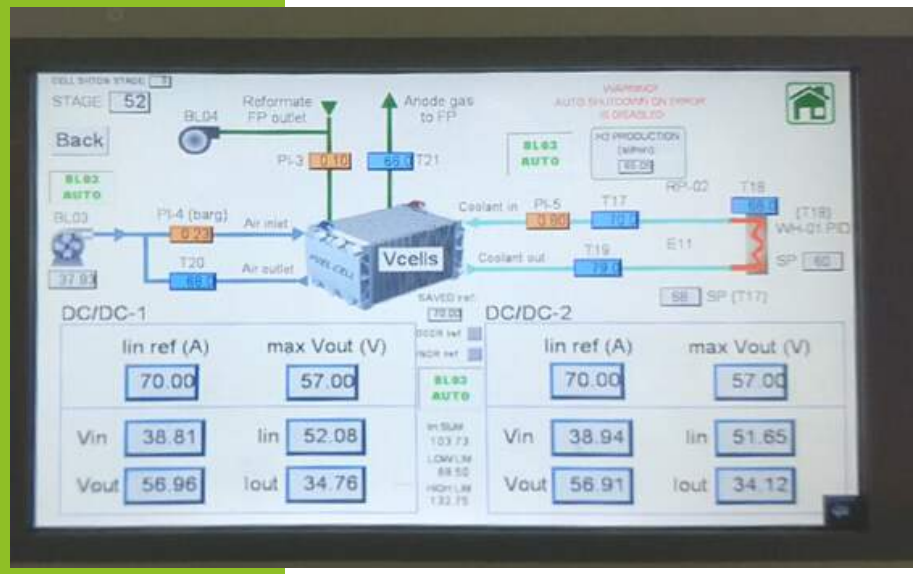
FEATURES

The unit is equipped with a power management system, delivering electrical energy in the form required (DC or AC, grid connected or stand alone), depending on application. It has the ability to operate in the range of 40-100% of its nominal capacity. Its electrical efficiency is greater than 35% (based on LHV), while total efficiency exceeds 85%.

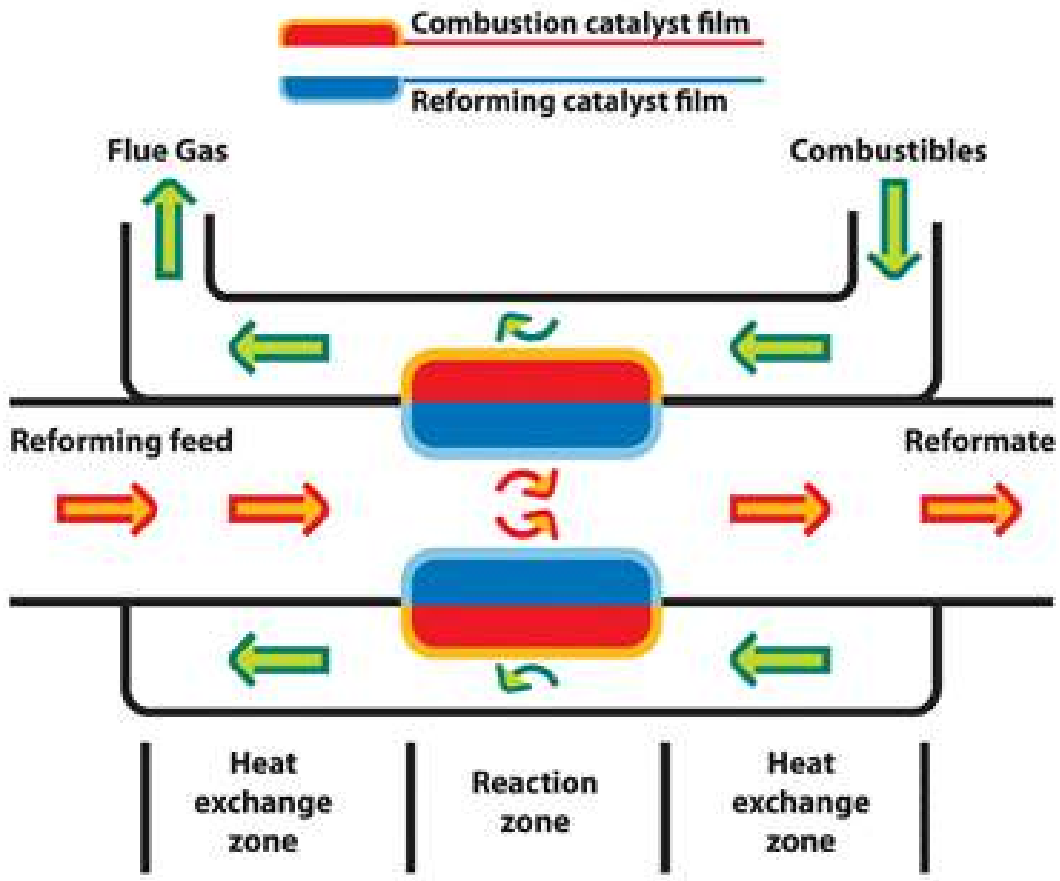
FEATURES

The integrated system consists of the following sub-units:

- Fuel processor/hydrogen production unit, where hydrogen production takes place via the reformation of the feeding fuel
- Low temperature PEM fuel cell stack, where power production takes place using the produced hydrogen from the fuel processor
- Batteries and electronic power management systems, where the excess produced power is managed
- Control system, capable to control the unit and to achieve proper, smooth and safe operation of the H2PS-5 product.



TECHNOLOGY



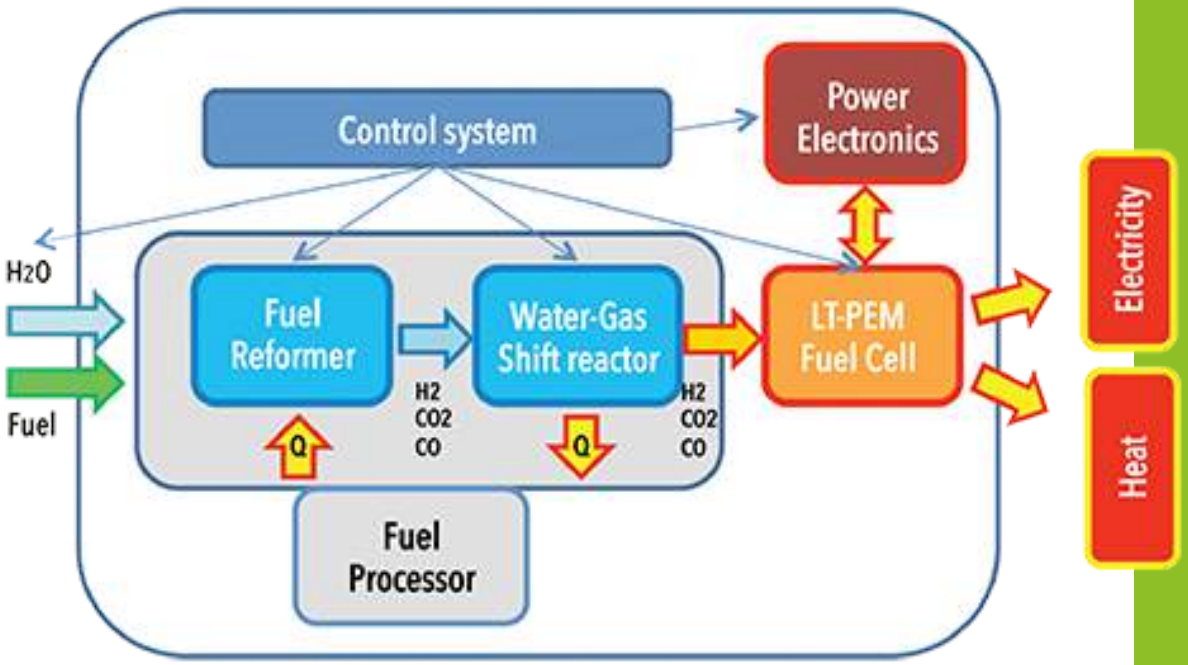
Heat-Integrated Wall Reactor (HIWAR)

H2PS-5 is based on highly innovative and efficient technologies.

The key technology and innovation pertains to an integrated approach of the reforming reactor and the required catalyst.

This has resulted in the so-called Heat Integrated Wall Reactor (HIWAR) which offers significant advantages over conventional reactors/catalysts: very rapid heat transport, very small quantities of catalyst required, very compact, enhanced safety, high power to volume ratio and lower operating temperatures.

TECHNOLOGY



H2PS-5 uses PEM-FCs coupled with a fuel processor based on a reforming step in advance.

FIRST STEP:
Steam Reforming= hydrogen and carbon monoxide production.

SECOND STEP:
Energy production= use of low temperature PEM fuel cell

TECHNICAL DATA

POWER PRODUCTION UNIT

Rated power production: 5 kW
Max. electrical efficiency: 35 %
Max. total efficiency: 85 %
Power characteristics: 48 VDC
Rated heat production (hot water @70 °C): 6 kW
Operating range: 40 - 100 %
Utilities specifications and consumption, at full load:

- Natural gas @ rated capacity (>91% CH4): 1.3±5 % Nm3/h
- Parasitic power consumption: <0.7 kW
- De-mineralized water: 4.9±5 % l/h
- Water specific conductivity

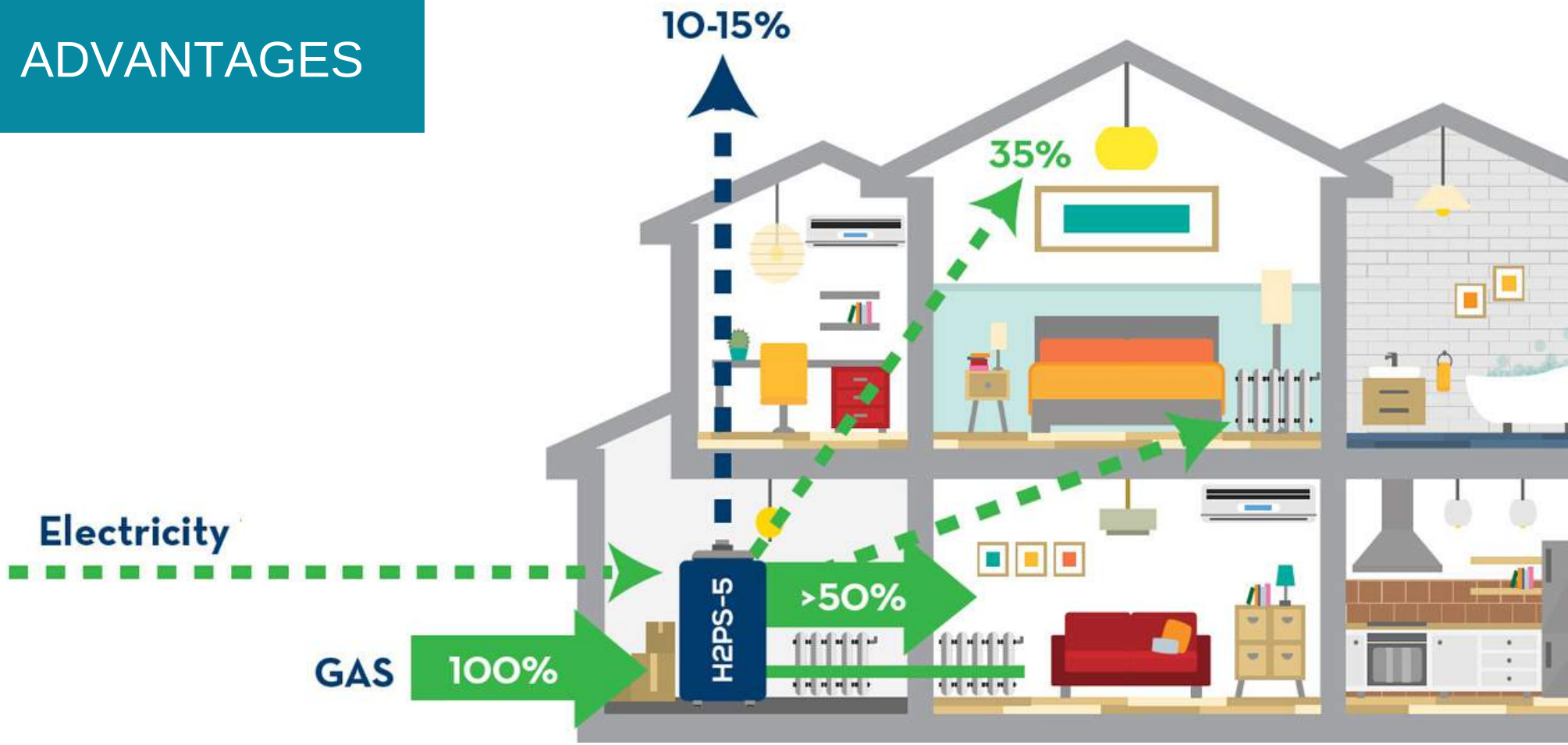
Materials of construction for all unit's versions:

- vessels: heat resistant stainless or lower grade stainless steel
- piping: stainless steel, painted carbon steel or plastic
- supporting structure painted carbon/stainless steel

CABINET

Dimensions: 65 x 70 x 160 cm
Weight: 200 kg
Ambient operating temperature: 4 - 40 °C
Corrosion protection: outdoor paint
Protection grade: IP30

ADVANTAGES



- Electrical efficiency greater than 35%
- Less operating costs
- Reduced maintenance costs
- Reduced emissions of NOx, HC, CO
- Very low noise and vibration levels
- Improved safety (no flames)
- Excellent performance at partial loads
- Capable to operate with raw biogas

APPLICATIONS

- Electrical power or combined heat and power (CHP) production systems for distributed generation (DG)
- On-board auxiliary power units (APU) for vehicles and leisure applications such as campers and boats
- Back-up power supply systems
- Hydrogen production units for industrial applications to replace the existing hydrogen transport and storage facilities.
- Telecommunication stations
- On- or off- grid households and other buildings
- Small-size farms with biogas availability
- Trucks

FAQ

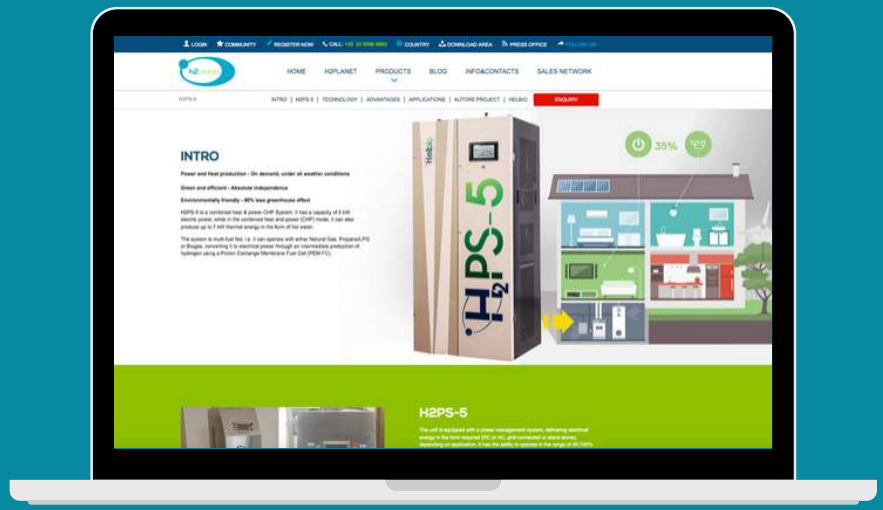
A. Is the fuel consumption fixed?
R. No, it can vary depending on the power consumption and depending on purity of natural gas in terms of methane content.

A. How much electricity and heat does it provide?
R. 5kW of electricity and 6kW of thermal power

A. Can it work constantly and at constant power?
R. Yes, the power supplied remains constant unless the maximum that can be supplied is changed from the control panel

A. What is the expected life of the system?
R. It is estimated up to 20 years if the micro-cogenerator includes the Care Plan H2planet planned and recommended by Helbio

H2planet is the exclusive reseller for Italy, Spain and reseller for Netherlands



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