SO Fuel Cell AND SOLIDpower

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SOLIDpower GmbH


ENERGY IS OUR PACE
OF PROGRESS

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ABOUT US

History

Location

Production Plant

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BlueGEN BG-15

OUR HISTORY

2000

EPFL (CH) Spin Off
HTceramix

SOFC POWER

2007

SOFCpower was founded,
acquisition of **HTceramix**

2008

Pilot Plant in Italy,
G8 stack technology

2014

Roll-out within European
Ene.field program

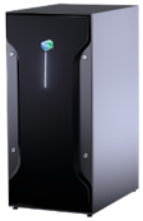
OUR HISTORY

2015

Asset acquisition of Ceramic Fuel Cells GmbH

2016

Restart commercialization of **BlueGEN**



2018 + 2019

1300 units sold, 30 GWh produced, **BG-15 release, New plant Italy** (50 MW/y planned)

OUR LOCATIONS

SOLIDpower GmbH
Heinsberg
Germany

SOLIDpower S.A.
Yverdon
Switzerland

SOLIDpower S.p.A.
Mezzolombardo
Italy

SOLIDpower AU
Melbourne
Australia

OUR PRODUCTION PLANT 1 (ITALY)

- 3.600 square meters
- Around 100 employees
- Capacity in products/day: 300 cells/shift or 4 stacks/shift
- Research and development

SOLIDpower
Mezzolombardo, Italy

OUR PRODUCTION PLANT 2 (GERMANY)

- 1.600 square meters
- Around 85 employees
- Capacity in products/day: up to 32 units/day
- Assembling

SOLIDpower
Heinsberg, Germany

OUR NEW PRODUCTION PLANT 3 (ITALY)

OPENING SEPT. 2019

- 6.400 square meters
- 100 employees
- Capacity in products/day: 60 stacks/day
- Stack production

SOLIDpower
Trento, Italy

OUR REFERENCES & INSTALLATIONS

- 1300+ units installed
- 12 countries
- 24 Mio. hours of operation
- 30 GWh produced (6k ton CO_2 saved)
- 1,5% reduction of efficiency per year
- Stack lifetime 7 years

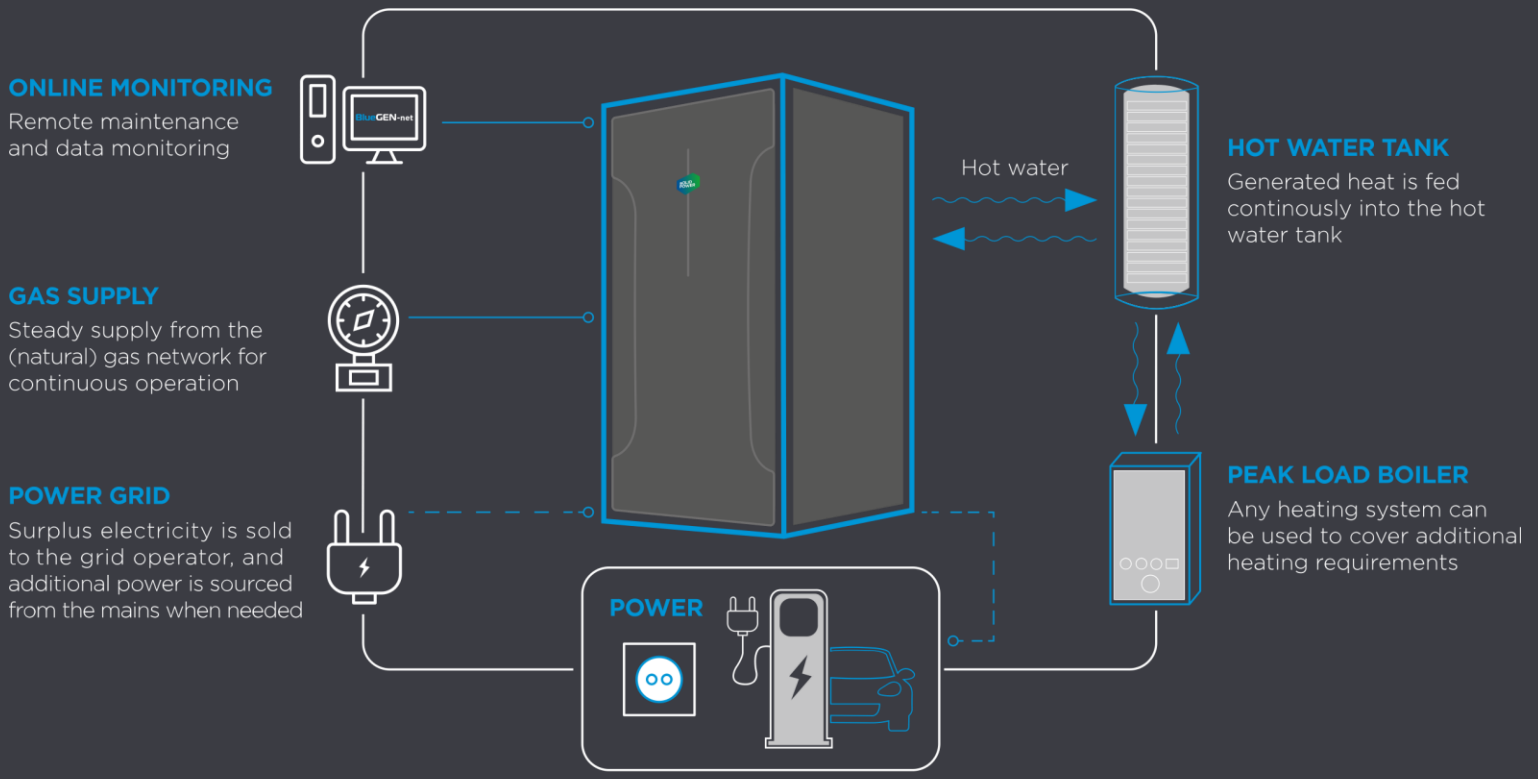
SELECTED References


SOLID POWER
BlueGEN
BG15

OUR PRODUCTS

BlueGEN BG15

Generate power and heat for businesses and homes



OUR PRODUCTS: BG-15

Key features

1.5 KW ELECTRIC POWER
UP TO 13,000 KWH OF ELECTRICITY PER YEAR

ADDITIONAL HEAT
E.G. FOR YOUR WARM WATER

CONTINUOUS OPERATION
RELIABLE ENERGY 24/7

EFFICIENT & AFFORDABLE
PROTECTS THE ENVIRONMENT AND YOUR WALLET

EASY INSTALLATION
COMPATIBLE WITH ALL HEATING SYSTEMS

IMPROVES THE ENERGY PERFORMANCE OF YOUR BUILDING NO EXPENSIVE ADDITIONAL MEASURES

OUR PRODUCTS: BG-15

ENERGY 24 / 7 – SERVICE 24 / 7

LOW ENERGY COSTS
DUE TO THE SYSTEM'S OUTSTANDING EFFICIENCY

PROTECT THE ENVIRONMENT
REDUCES YOUR CARBON FOOTPRINT UP TO 50%

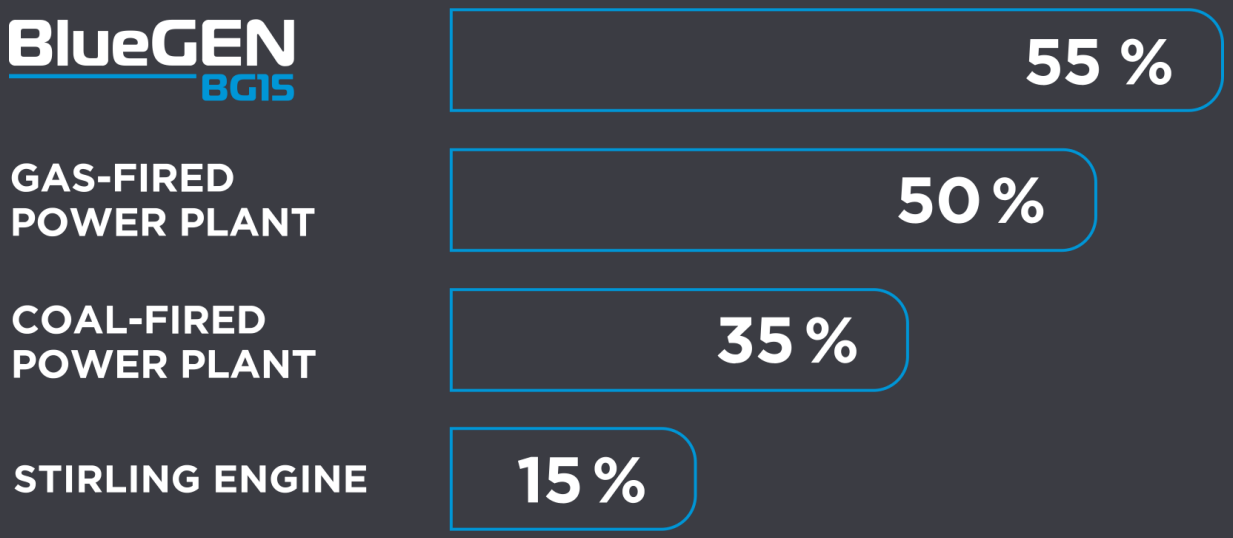
ALL-INCLUSIVE SERVICE & MAINTENANCE
THROUGH MANUFACTURER

LOW SPACE
REQUIREMENT FOR CASCADING MULTIPLE UNITS

APP
FOR MONITORING & POWER PROFILING

OUR PRODUCTS: BG-15

Electrical Efficiency



OUR PRODUCTS: BG-15

Complete control

Control and full access to the extensive data:

- ✓ Electricity you are producing
- ✓ CO_2 emissions you have saved

- ✓ For iOS and Android
- ✓ $HTML_5$ responsive
- ✓ Security compliance (GDPR)
- ✓ Monitoring / power profiling

Download on the App Store

GET IT ON Google Play

OUR PRODUCTS: BG-15

Increasing power demand ? More BG-15s!

Two or more BG-15 units can be combined easily to create a cascade.

OUR PRODUCTS: BG-15

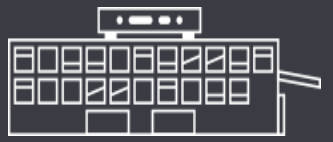
Technical Specification

Electrical power	Max. 1.5 kW Min. 0.5 kW	Default operation mode: Constant operation at maximum electrical efficiency, output 1.5 kW
Electrical efficiency*	Up to 55%	At 1.5 kW electrical output
Thermal power*	Up to 0,85 kW	At 30°C return temperature
Overall efficiency*	Up to 88%	At 1.5 kW electrical output and < 30°C return temperature
Ramp rate electrical power	Up: 50 W/min Down: 50 W/min	Depending on system conditions
Weight	230 kg	
Dimensions	1200 x 550 x 800 mm	Height x width x depth

OUR PRODUCTS: BG-15

SPORT CENTERS

BIG SFH OR MFH



SME AND OFFICES

CONDOS

BlueGEN BG15

SWIMMING POOLS

TERRACES HOUSES

HOTELS

SCHOOLS

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SOFC

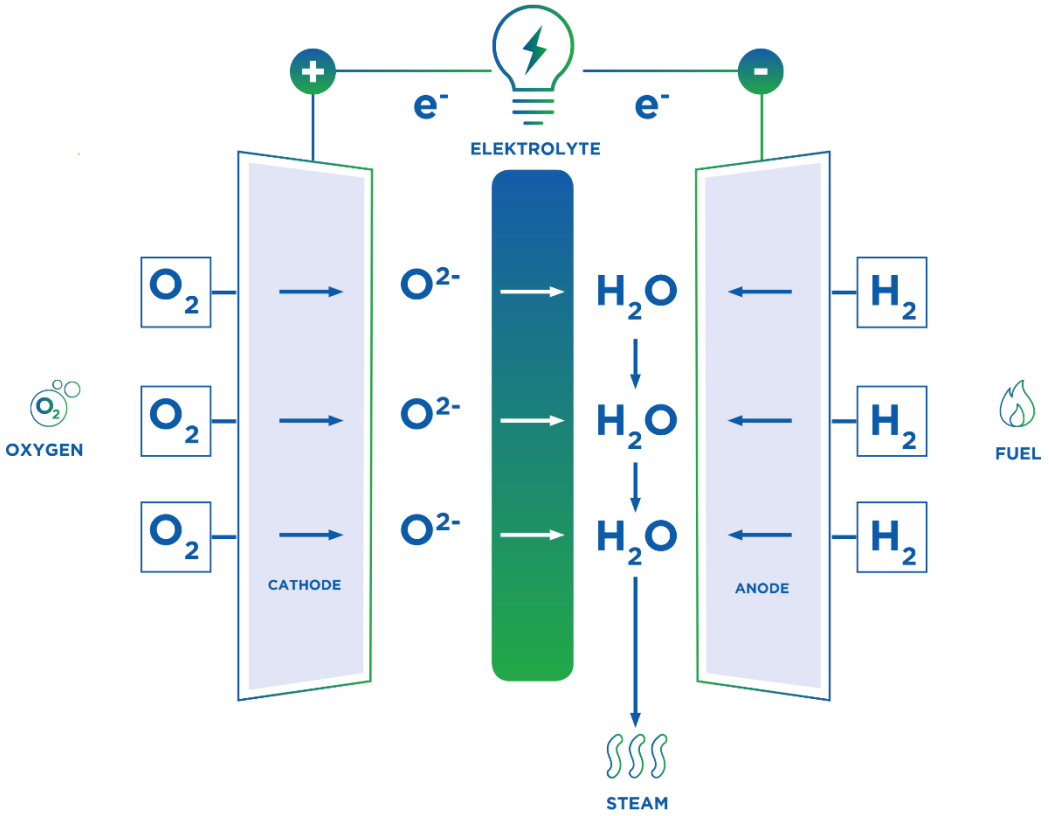
Principle

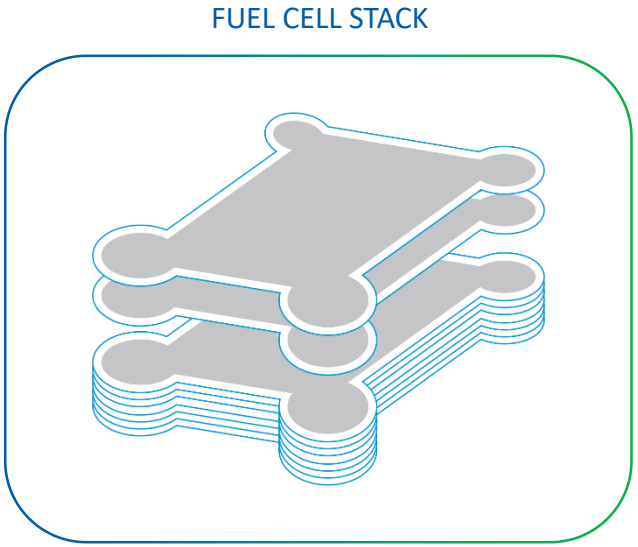
Advantages

Market Potential

SOFC PRINCIPLE

Principle of a Fuel Cell





SOFC PRINCIPLE

NATURAL GAS
LIQUID FUELS
COAL (GASIFIED)
BIOFUELS
HYDROGEN
AMMONIA

AIR

WATER

SOFC

SOLID
OXIDE
FUEL
CELL

ELECTRICITY

HEATING

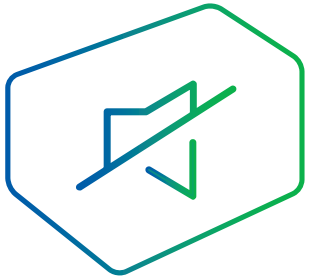
COOLING

WATER

NO CO_2

SOFC ADVANTAGES

Key Advantages:

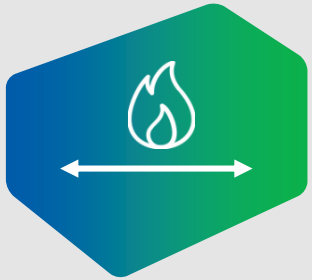


SILENT OPERATION
(NO MOVING PARTS)

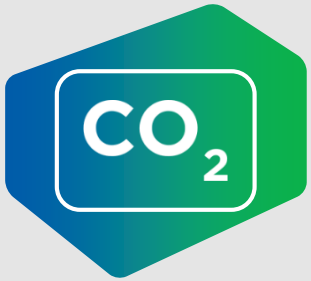
HIGHER EFFICIENCY
THAN COMBINED CYCLE
GAS TURBINES (> 60% AC DELIVERED)

CLEAN EMISSIONS
NO SO_X OR NO_X

Other unique features:

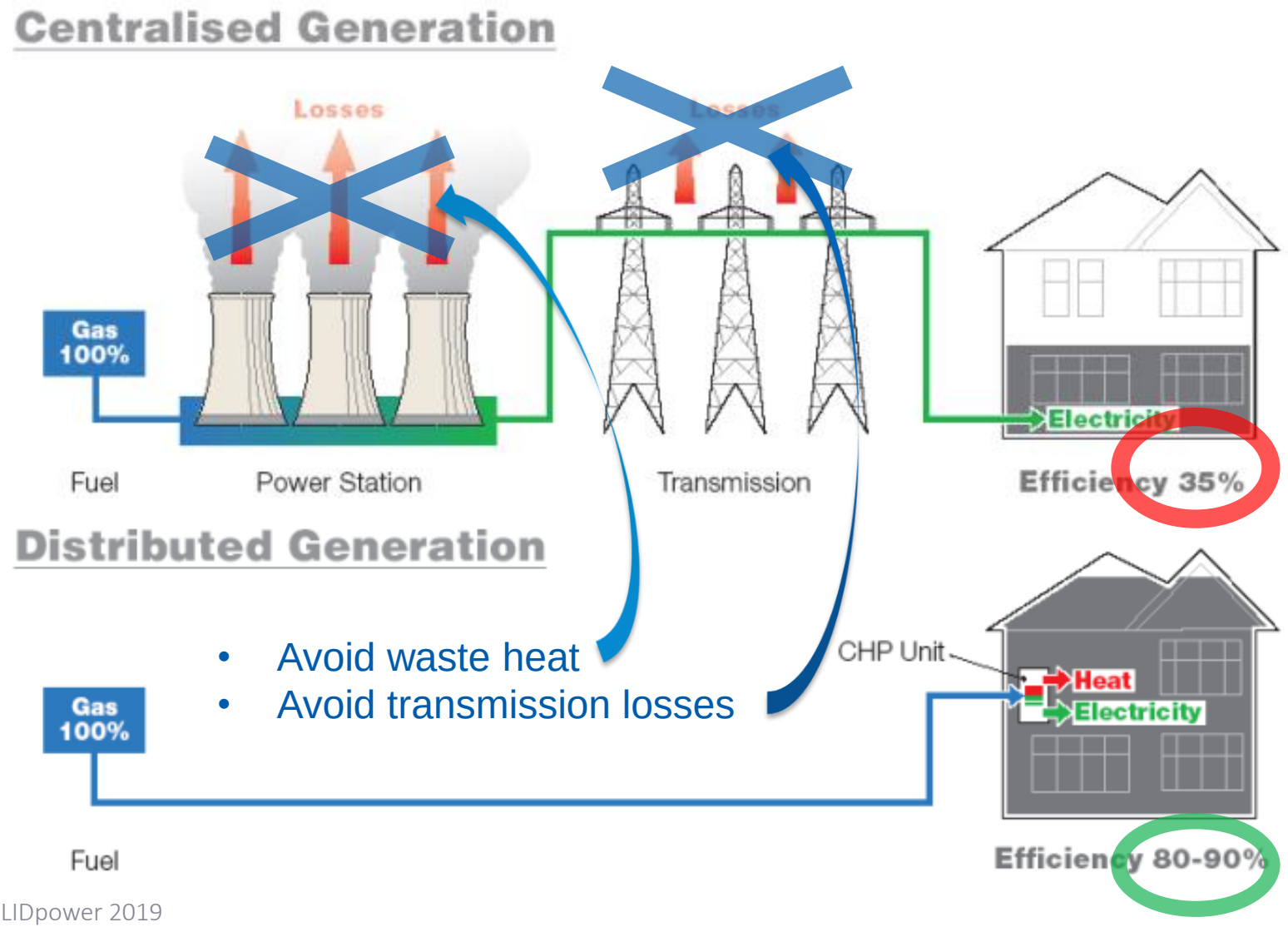


WIDE RANGE OF FUELS
(H_2, GAS, BIOGAS, ETC.)



CO_2 CAPTURE "BUILT-IN"
WITHOUT LARGE INVESTMENT
OR EFFICIENCY PENALTY

SOFC ADVANTAGES: DISTRIBUTED GENERATION



SOFC ADVANTAGES

Clean Energy

ULTRA-CLEAN:

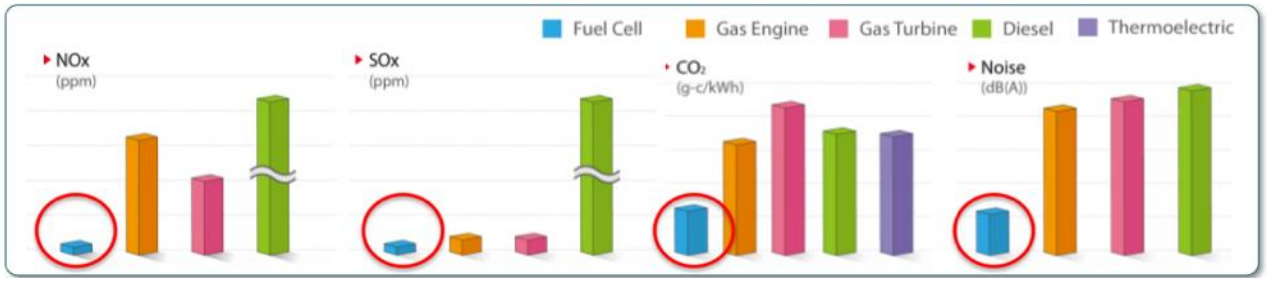
Fuel cell power promotes healthy living & helps preserve the environment

NEAR “0” POLLUTANTS:

Combustion-free fuel cell creates electricity without pollutants no NOx, SOx and particles.

LOW to zero CARBON FOOTPRINT:

Release less CO_2 than combustion-based generation due to high efficiency. Zero emission on Green gas or Green Hydrogen



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NEXT STEPS

Future Products

Future Projects

FUTURE PRODUCTS

BlueGEN BG-60: Key elements specifications

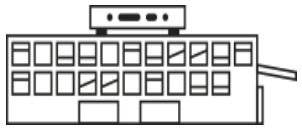
- Nominal Power: 6 kW
- Net electrical efficiency: 60%
- Net cogeneration efficiency: 90%
- Thermal Cycles: 12/y
- Operation without any tap water, incl. Start-up and cool-down
- Operation mode: load following, heat capped or DC-control loop
- Installation indoor
- Floor standing
- Plastic chimney
- Annual service by front panel only
- On-board display: LED
- Stackable units

FUTURE PRODUCTS

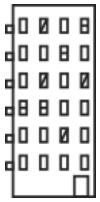
BG-60: Applications (mCHP)

SPORT CENTERS

BIG SFH OR MFH

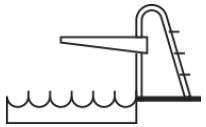


SME AND OFFICES



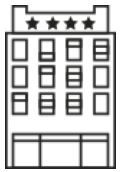
CONDOS

BG-60



SWIMMING POOLS

TERRACES HOUSES



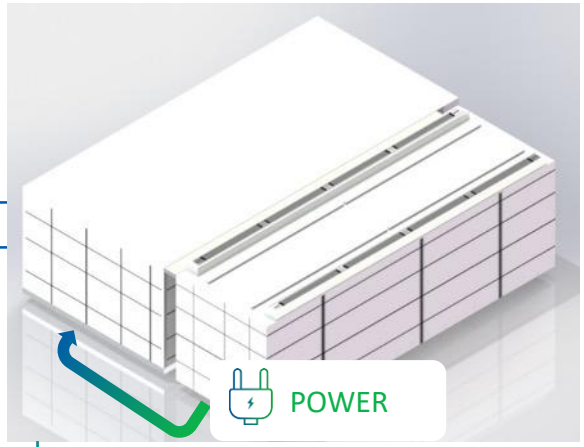
HOTELS

SCHOOLS

MIN BASE-LOAD OF 6 KW

FUTURE PRODUCTS

BlueGEN BG-60: Applications (Datacenter)



MODULE UP TO 480 KW

- Input = low pressure gas
- Individual power generator
- DC (or AC)
- Load following

BG-60 MODULE

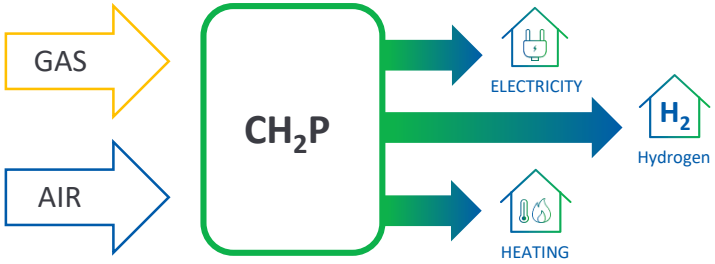
6kW, 2 levels to power

FUTURE PROJECTS

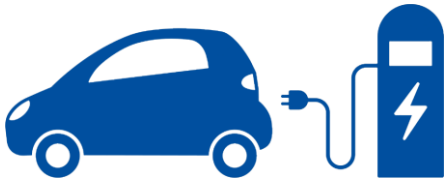
Development Project CH2P with Shell

PROJECT GOALS

CH_2P – Combined H_2, Heat&Power



APPLICATION



HRF with 100-200 kg H_2/h

PARTNERS

FUNDING

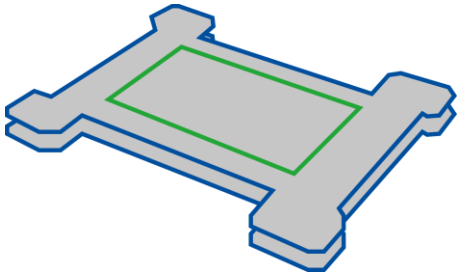
1. EU cofounded project CH_2P
2. Shell contributuion

FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

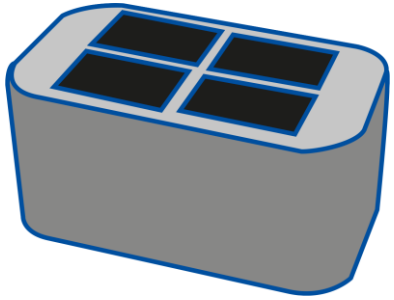
FUTURE PROJECTS

Similar design principles secure scale up with high performance and minimum risks.

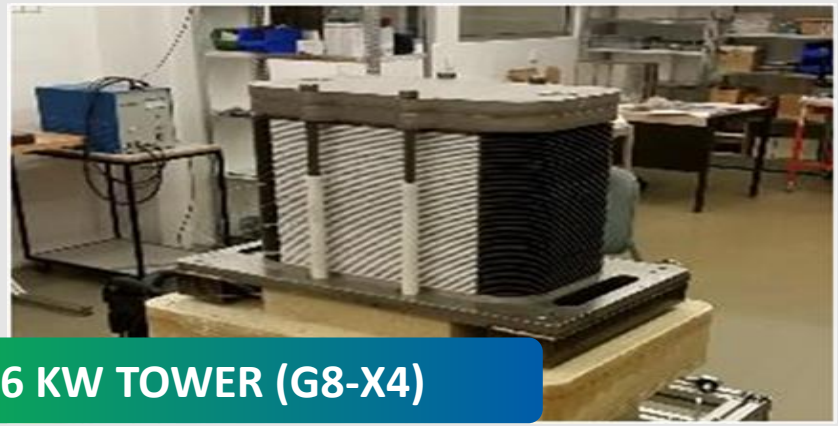
G8



G8-X4

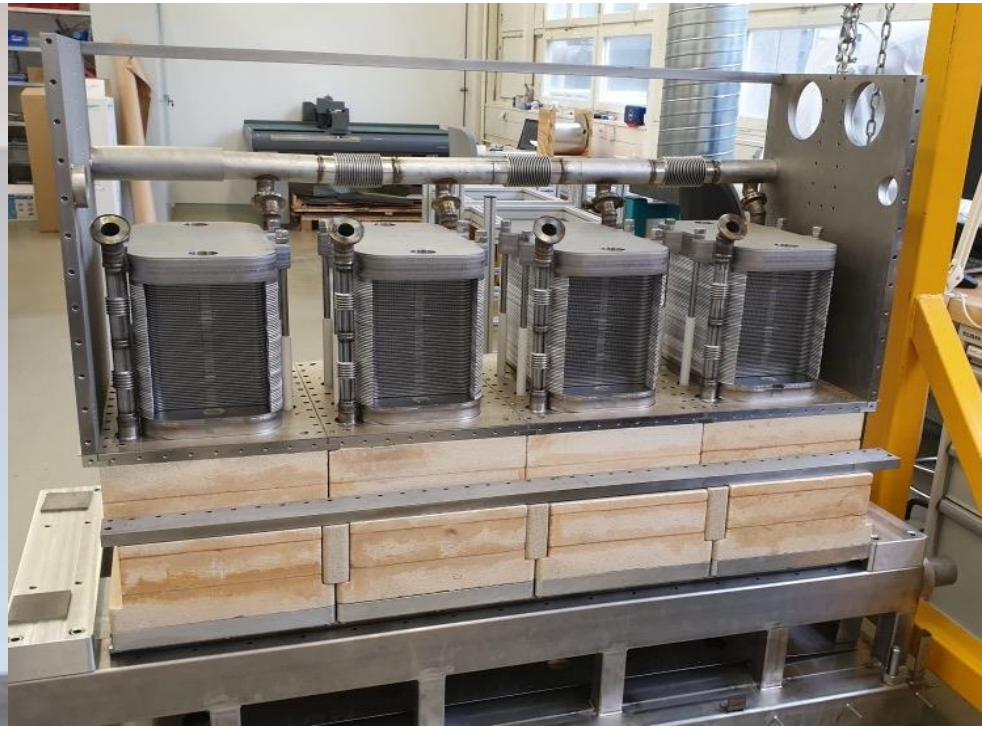


Successful test with 6,7 kW and 62% electrical efficiency.



6 KW TOWER (G8-X4)

FUTURE PROJECTS



25 kW module (4 towers)

- Larger Stack Module with 4 stack towers
- Produces 25 kW electrical power in Solid Oxide Fuel Operation
- 75 kW power of chemical energy (H2, synthetic fuel) in Solid Oxide Electrolyser Operation

SOLID POWER

MAY THE POWER BE WITH YOU!

BACKUP

SOFC MARKET POTENTIAL

Global Solid Oxide Fuel Cells Market Analysis*

$2.6 BILLION BY 2025:

The global market for Solid Oxide Fuel Cells (SOFCs) is projected to reach $2.6 billion by 2025, driven by the ever increasing global demand for electricity and rising focus on clean and renewable energy production.

INCREASE ELECTRICITY PRODUCTION:

With per-capita consumption of electricity on the rise worldwide, the need to increase electricity production has become a top priority for governments across the globe.

ASIA-PACIFIC IS THE LARGEST MARKET:

Asia-Pacific represents the largest and the fastest growing market worldwide.

*Merkle & Sears, Global Solid Oxide Fuel Cells Market Analysis, April 2019. Strategic assessment of a high growth market.