

D1.7- Summary report on specifications for newest model deployment in PACE (July 2022)

Element Energy



PACE project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 700339.

This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme and Hydrogen Europe and Hydrogen Research.

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Introduction and Contents

- The aim of this report is to provide information on the newest models of fuel cell micro-combined heat and power (FC mCHP) units being offered by the 6 manufacturers involved in the PACE project: BDR-Thermea, Bosch, SOLIDpower, Sunfire, Viessmann and Hexis.
- The target audience of this report includes industry and consumers alike. As well as the key technical specifications and benefits of the newest models, this report also indicates how further information can be accessed by interested parties.
- In the report you will find the following:
 - An overview of the PACE project
 - Information from each PACE manufacturer on their technology. This includes:
 - A technical overview of the newest models including specifications and comparative differences with previous models;
 - Feedback from existing customers;
 - Resources where additional information can be found (including official marketing material in different languages when available).
- The report was prepared in April 2020 and updated in May 2021 and July 2022. More recent information may be available on the manufacturers' website at the time of reading.

PACE at a glance

Promoting a successful transition to the large scale uptake of Fuel Cell micro-Cogeneration across Europe

10

Partners

Representing
manufacturers,
utilities & research
community

> 2,800

Fuel Cell micro-
Cogeneration
units

To be deployed
across Europe
between 2016-
2022

>500

Systems per
manufacturer

Established
production
capacity per
manufacturer

10

Countries

Where the units
will be installed

4

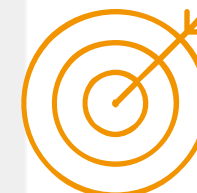
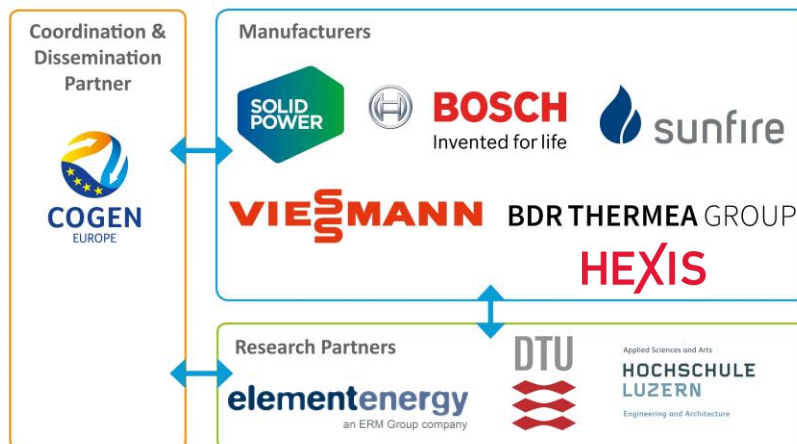
Countries

Selected for policy
& market
development
(Belgium, Italy,
Netherlands and
UK)

€90m

Total budget

Including €33.9m
Horizon 2020
funding via the
Clean Hydrogen
Partnership
(previously FCH JU)



>10,000

FC micro-
cogeneration
units/year post 2020

- Field trial + installer training + targeted market & policy development activities
- Field trial + local installer training



Pathway to a Competitive European
Fuel Cell micro-CHP Market

BDR THERMEA GROUP

25/07/2022

BDR Thermea

SenerTec Dachs 0.8

Remeha eLecta 300

Technical Specification	SenerTec Dachs 0.8
Fuel cell type	PEM
Operational mode	Heat-led
Electrical output	0,705 kW
Thermal output	1,0 kW + 22,8 kW
Electrical efficiency	39%
Overall efficiency	93%
Fuel flexibility	H Gas, L Gas, H2 ready
On-off cycles	4000 cycles
Stack lifetime	85 000h
System life	20 years

- Increased overall efficiency
- Increase of maintenance interval for fuel cell stack
- Increase of flexibility for radiator systems
- Higher level of integration of pre-assembled complete FC heating system
- Fits in low basement
- Integrated energy management, which can be accessed remotely from the owner and the service stuff via internet
- Easy to connect into a „smart home“ system

Technical Overview

DACHS 0.8 GenD



Abb. 1: Komplettsystem Dachs 0.8 GenD



Pathway to a Competitive European
Fuel Cell micro-CHP Market

Key marketing materials

Flyers

- information sheet fuel cell
- technical data sheet
- flyer grants for private users
- flyer investment for private customers
- digital flyer fuel cell „tomorrow's modern heating system“

Brochure

- Brochure “a Dachs in your home”

Link to
marketing
materials:

<https://www.senertec.de/typo3/de/partnerbereich/vertrieb/dachs-planung-administration/dachs-08-pace-unterlagen.html>



Further Resources



BORTHNER GROUP

Events and Campaigns (Jan – June 2022)

- Trade fairs: IFH-Intherm Nürnberg (April 26th – April 29th)
- Newsletters: SI Journal (April 21st)
- SenerTec Event powered by Heinze (special event for architects on June 2nd in Munich)
- Website – product detail page <https://www.senertec.de/dachs-0-8/>
- Website – target group <https://www.senertec.de/dachs-eigenheim/>
- Social media campaigns (Facebook, Instagram)
- Press releases 2022, please see: <https://www.senertec.de/presse/>
- Videos (how to install a fuel cell, functionality of a fuel cell etc.)
- Regional events organized by the SenerTec Centers (e.g. Obermeistertagung Nürnberg April 30th)



Further Resources



Dachs Info Webinar For Interested Parties

30. Jun 22	Online professional seminar: KWK in jeder Immobilie	professional planner
7.-8. Juli 22	Bronze-Service- Schulung Dachs 0.8	installer
19. Jul 22	Dachs Info Web-Seminar	interested parties
13. Sep 22	Dachs Info Web-Seminar	interested parties
14.-15. Sep 22	Bronze-Service- Schulung Dachs 0.8	installer
11. Okt 22	Dachs Info Web-Seminar	interested parties
27.-28. Okt 22	Bronze-Service- Schulung Dachs 0.8	installer
22. Nov 22	Dachs Info Web-Seminar	interested parties
8.-9. Dez 22	Bronze-Service- Schulung Dachs 0.8	installer
13. Dez 22	Dachs Info Web-Seminar	interested parties
After summer break	commissioning Dachs 0.8 in the SHK guild in Schweinfurt	invitation to guild companies
Nov. / Dez. 22	Online professional seminar: KWK in jeder Immobilie	professional planner



Der Dachs 0.8 mit Brennstoffzelle

Die Brennstoffzelle: Jetzt serienreif für Ihre Immobilie. Endlich gibt es die effiziente Brennstoffzellentechnologie auch für zu Hause - leise, wartungsarm, sparsam und umweltfreundlich.

Der Dachs 0.8 funktioniert nach dem Prinzip der Kraft-Wärme-Kopplung. Dabei wird gleichzeitig Strom und Wärme erzeugt. Das spart Energie und ist umweltfreundlich. Strom und Wärme werden am Ort des Verbrauchs in modernen Immobilien, die auch in puncto Energieversorgung auf die beste Technologie setzen.

Modularer Systemaufbau:

- Zusätzlicher Spitzenlastkessel mit Brennstoffzelle
- Laufzeitverlängerung dank 300 Liter Pufferspeicher
- Einfach kombinierbar mit Stromspeicher
- Hydraulikmodul mit bis zu zwei getriggerten Heizkreisen
- Trinkwasserumwälzung
- Energiemanager mit Touchscreen
- Einfache Logistik, Einbringung und Installation durch modularen Aufbau

IMMOBILIE-INFO-WEBINAR

Von unseren Experten erhalten Sie online bequem und flexibel alle wichtigen Informationen über die Kraft-Wärme-Kopplung - von der Technologie, über die Fördermöglichkeiten bis hin zur Wirtschaftlichkeit einer strom-erzeugenden Heizung.

Eine Übersicht unserer aktuellen Webinare erhalten sie hier.

Wir freuen uns über Ihre Teilnahme!

Bei weiteren Fragen wenden Sie sich bitte an: dachs-akademie@senertec.com



ENERGIE WENDE



SENERTEC

Dachs-Info-Web-Seminar

Werden Sie jetzt zum Energie selbstversorger: Mit dem Dachs, der stromerzeugende Heizung.



Unsere Experten klären im kostenfreien Web-Seminar folgende Fragen:

- Ist der Dachs für meine Immobilie geeignet?
- Wie rechnet sich die Investition in eine stromerzeugende Heizung?
- Welche staatlichen Zuschüsse und Förderungen gibt es?
- Welchen Beitrag zum Klimaschutz kann ich mit einem Dachs leisten?

Zudem präsentieren wir Ihnen brandneu in unserem Produktportfolio die Batteriespeicher und die E-Ladestation - zwei starke Partner für eine sichere Energieversorgung in Ihrer Immobilie.

Ganz gleich, wo Sie leben, arbeiten oder ob Sie viel unterwegs sind, eine Teilnahme ist von überall möglich, solange eine Internetverbindung besteht. So erhalten Sie bequem und flexibel alle wichtigen Informationen aus erster Hand vom Hersteller. Ihre offenen Fragen klären wir gerne Live am Ende des Web-Seminars. Sichern Sie sich jetzt einen Teilnehmerplatz und kommen Sie mit uns ins Gespräch!

Mehr Infos unter: dardachs.de
Datenschutz: senertec.de/datenschutz

*Pflichtfeld

Vorname* Nachname*

E-Mail-Adresse* Adresse*

Ort* PLZ/Postleitzahl*

Telefonnummer*

Fragen und Anmerkungen

Durch Klicken auf diese Schaltfläche übermitteln Sie Ihre Angaben an den Webinar-Organisator, damit dieser sich mit Ihnen bezüglich dieser Veranstaltung und anderer Serviceleistungen in Verbindung setzen kann.

Anmelden

Link to registrations: <https://register.gotowebinar.com/rt/6978209278538574595?source=PACE>

Technical Specification	Remeha eLecta Ace 300
Fuel cell type	PEM
Operational mode	Heat-led
Electrical output	0,705 kW
Thermal output	1,0 kW + 22,8 kW
Electrical efficiency	39%
Overall efficiency	93%
Fuel flexibility	H Gas, L Gas, H2 ready
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Stack lifetime	85 000h
System life	20 years

- Increased overall efficiency
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eLecta Ace 300



eLecta Ace 300 Die smarte Brenn- stoffzellen- heizung

Weil uns Wärme nicht
genug ist



Remeha eLecta

Weitere Infos: remeha.de/brennstoffzelle

Alle Vorteile im Überblick

- > Hocheffizient durch gemeinsame Erzeugung von Wärme und Strom im Ein- und Zweifamilienhaus (Bestand und Neubau)
- > Perfekt geeignet auch für kleinere Gewerbebetriebe mit ganzjährig gleichbleibendem Strom- und Warmwasserbedarf (Studios, Agenturen, Kanzleien, Praxen etc.)
- > Innovative Technik aus bewährter Hand – aktuell bereits in zweiter Geräte-Generation
- > Hybrid-Systemlösung als vorgefertigtes Plug-&-Play-Komplettsystem
- > Reduzierte Energiekosten, größere Unabhängigkeit von steigenden Strompreisen und dem Strombezug aus dem Netz
- > CO₂-Einsparung bis zu 50 % gegenüber herkömmlicher Strom- und Wärmeerzeugung
- > Sehr hohe staatliche Förderung
- > Remeha Vollwartungsvertrag in zwei Varianten
- > Hoher Wärmekomfort und reduzierte Wärmeverluste mit legionellenfreier Trinkwasserwasserbereitung durch integrierte Frischwasserstation
- > Geringe Geräuschemissionen
- > Erforderliche Kellerhöhe: nur 1,95 m
- > Wartung des Brennstoffzellen-Heizgerätes nur alle 6 Jahre
- > Robuste Betriebsweise durch Systemtrennung
- > Verschleißarme Technologie: Stromerzeugung ohne mechanische Umwandlung, keine beweglichen Teile bei der Stromerzeugung
- > Neueste Ace Controls Regelungsplattform mit Touchdisplay



Web-App liefert Live- und Bestandsdaten

Über das Online-Portal KWK-Connect können Sie Ihre eLecta Ace 300 jederzeit überwachen und monitoren. Auch auf Ihrem Smartphone. Auf einem übersichtlichen Dashboard lassen sich alle technischen Anlagenwerte einsehen, wie z.B. die Stromerzeugung auf Tages-, Wochen- und Monatsbasis oder über die gesamte Laufzeit. Wenn Sie es wünschen, hat auch Ihr Handwerkspartner online Zugang zu den Daten – und kann Sie zu Service und Wartung beraten und unterstützen.

Key marketing materials and events

- Trade fairs: IFH Intherm April 2022 in Nürnberg, SHK Essen Sept. 2022
- Inhouse exhibitions at wholesalers
- Website, Videos, Portal KWK-Connect, Leaflets, installation manual and find fuel cell competence partners <https://www.remeha.de/produkte/erneuerbare-und-hybrid/gas-hybrid-waerme-und-strom/brennstoffzelle-electa-ace-300>
- PR trade media – product info and reference story
- Presentations for installers, planners and wholesalers
- Roll Ups for presentations
- Trainings and demonstrations at Remeha training facilities with demo products
- New products overview leaflet



Pathway to a Competitive European
Fuel Cell micro-CHP Market



25/07/2022

Bosch

BlueGEN (Buderus GCB and DHW)

Overview of launched GEN X/GEN Y/GEN Z FC-μCHPs units in PACE by Bosch

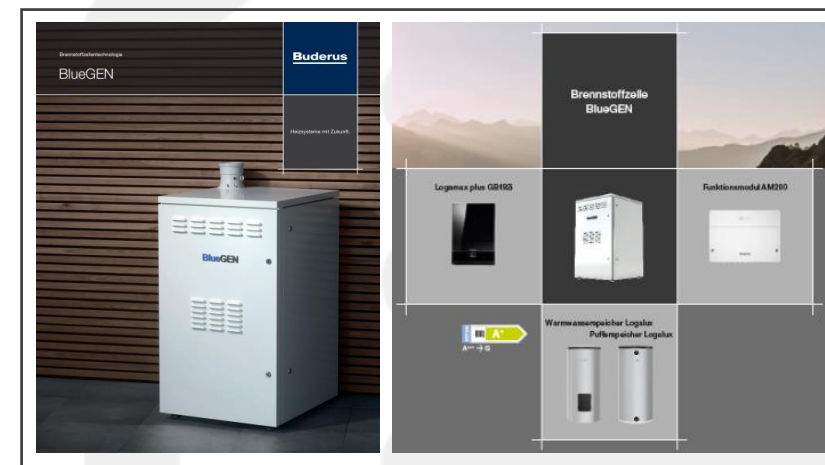
GEN X 100pcs:

- 200 – 700 W_{el.} output; max. energy production appr. 5500 [kWh/a]
- High el. efficiency (46%), high ratio of self consumption in STFH
- Fully integrated solution with focus on overall efficiency (85%)
- Preferred applications were single and two family homes > 95%
- Route to market = installer
- Sold from 06/2016 – 12/2018 (First installation was in 01/2017)
- **70 units** of the previous model (prototype) were installed in **ene.field**



GEN Y 200pcs:

- 1500 W_{el.} output; maximum energy production of approximately 13000 [kWh/a]
- Highest electrical efficiency (60%)
- Fits best to applications with high electrical consumption as for instance electrified STFH, MFH (50%) and small/light commercials (50%)
- Route to market = installer
- Sold from 10/2018 – 05/2020



Overview of launched GEN X/GEN Y/GEN Z FC-μCHPs units in PACE by Bosch

System approach with BlueGEN fuel cell, Buderus GCB and DHW – storage

- The new generation FC mCHP system offers both, electrical energy produced with the highest electrical efficiency combined with a highly efficient heating technology.
- Due to the modularity, various applications with different GCBs and heat storages are possible.
- Flexible integration and easy installation in addition to existing heating appliances is given as well.
- Key benefits for customers are CO₂-savings of up to 50%, as well as cost and energy savings.

Fair event and training with installers' feed back



Installers' feedback to BG0 model: High quality and very flexible



Overview of launched GEN X/GEN Y/GEN Z FC- μ CHPs units in PACE by Bosch

GEN Z 100pcs.:

- 500 - 1500 W_{el.} output; maximum energy production of approximately 13000 [kWh/a]
- Adjustable el. output by customer via App to increase self consumed el. energy as much as possible and thus the financial savings
- High electrical efficiency up to 57%
- Overall efficiency up to 90%
- Fits best to applications with high electrical consumption as for instance electrified STFH, MFH (20%) and small/light commercials (80%)



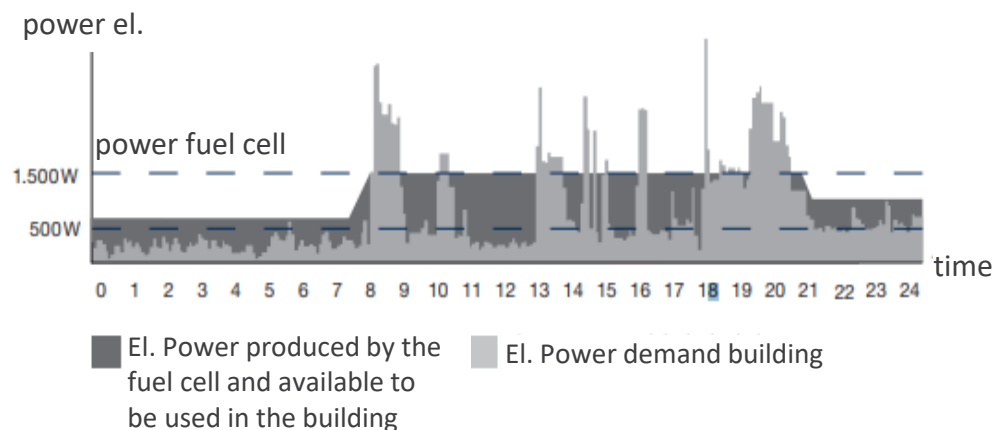
Technical Overview and Highlights GEN Z



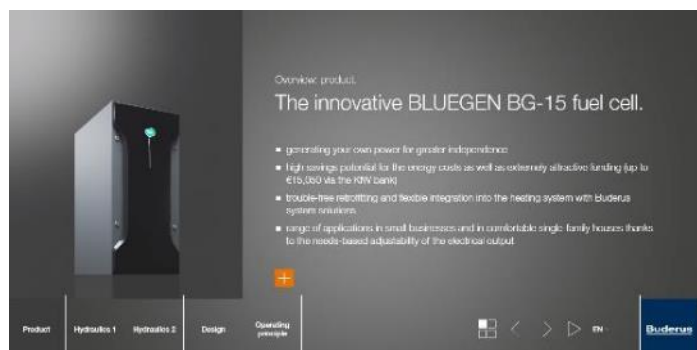
System approach with BG15 fuel cell, Buderus GCB and DHW – storage

Technical Specification	Buderus GCB and SOLIDpower BG15 fuel cell
Fuel cell type	SOFC
Operational mode	electricity-led
Electrical output	1.5 kW
Thermal output	0.85 kW
Electrical efficiency	57%
Overall efficiency	up to 90%
Fuel flexibility	H Gas, L Gas, Green gas, 20% H ₂ -ready
On-off cycles	6 cycles /year+ modulation
Stack lifetime	up to 40 000hrs
System life	15 years

- As system expert Buderus launched the BG15 fuel cell model in 05/2020 as successor to the BlueGEN model sold until 12
- Major advantage of the BG15 is the possibility to adjust its el. output in a range from 0.5kW – 1.5kW. This new feature gives customers the opportunity to calibrate the fuel cell's load profile following the building's load demand, to increase the self-consumed electricity and decrease the operational costs.



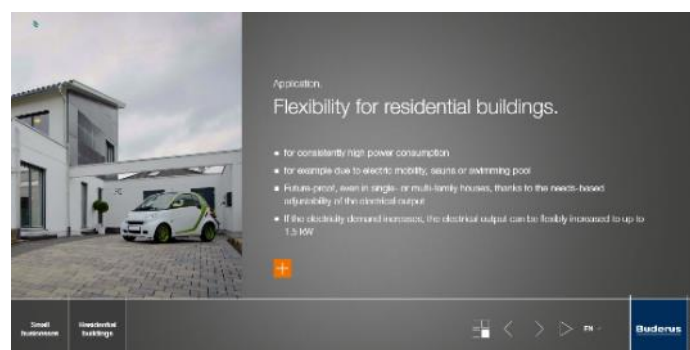
Further notable product highlights and system benefits!



Overview product:
The innovative BLUEGEN BG-15 fuel cell.

- generating your own power for greater independence
- High savings potential for the energy costs as well as extremely attractive funding (up to €15,000 via the KfW bank)
- trouble-free retrofitting and flexible integration into the heating system with Buderus system solutions
- range of applications in small businesses and in comfortable single-family houses thanks to the needs-based adjustability of the electrical output

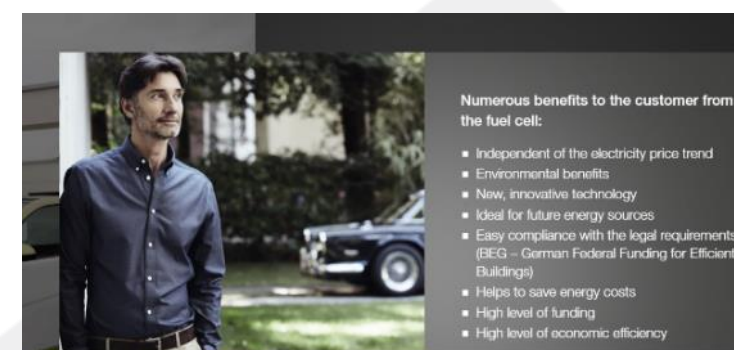
Product | Hydraulics 1 | Hydraulics 2 | Design | Operating principle



Application:
Flexibility for residential buildings.

- for consistently high power consumption
- for example due to electric mobility, sauna or swimming pool
- future-proof, even in single- or multi-family houses, thanks to the needs-based adjustability of the electrical output
- If the electricity demand increases, the electrical output can be flexibly increased to up to 1.5 kW

Small businesses | Residential buildings



Numerous benefits to the customer from the fuel cell:

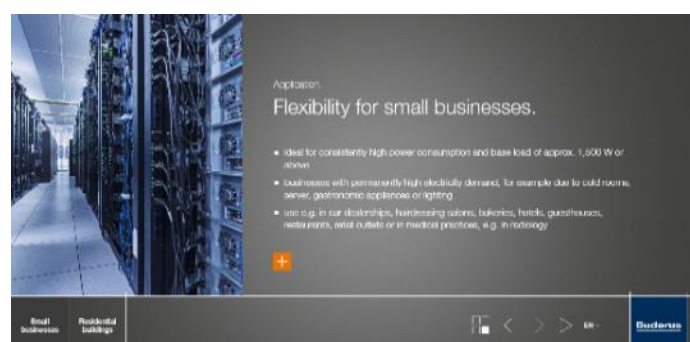
- Independent of the electricity price trend
- Environmental benefits
- New, innovative technology
- Ideal for future energy sources
- Easy compliance with the legal requirements (BEG – German Federal Funding for Efficient Buildings)
- Helps to save energy costs
- High level of funding
- High level of economic efficiency



Overview hydraulics 2:
System-optimized for any requirement.

1 or 2 house units with up to three domestic hot water tanks, all energy demands, hot water demand of less than 100 l/h, and up to 100 kW (maximum electrical output).

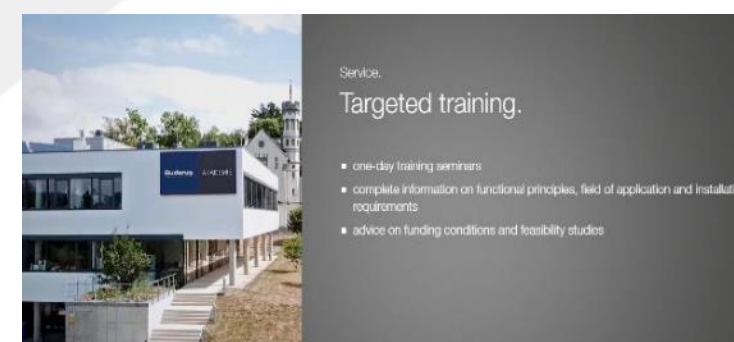
Product | Hydraulics 1 | Hydraulics 2 | Design | Operating principle



Application:
Flexibility for small businesses.

- ideal for consistently high power consumption and base load of approx. 1,500 W or above
- businesses with permanently high electricity demand, for example due to cold rooms, server, gastronomic appliances or lighting
- use e.g. in car dealerships, hairdressing salons, bakeries, hotels, guesthouses, restaurants, retail outlets or in medical practices, e.g. in radiology

Small businesses | Residential buildings



Service:
Targeted training.

- one-day training seminars
- complete information on functional principles, field of application and installation requirements
- advice on funding conditions and feasibility studies



Key marketing materials

	Germany
Website Buderus	https://www.buderus.de/de
Product information	https://www.buderus.de/de/produkte/catalogue/alle-produkte/108941_brennstoffzelle-bluegen
Benefits	https://www.buderus.de/de/produkte/catalogue/alle-produkte/108941_brennstoffzelle-bluegen
Product data sheet	https://www.buderus.de/de/produkte/catalogue/alle-produkte/108941_brennstoffzelle-bluegen
Brochure	https://www.buderus.de/de/produkte/catalogue/alle-produkte/108941_brennstoffzelle-bluegen
List price	https://www.buderus.de/de/produkte/catalogue/alle-produkte/108941_brennstoffzelle-bluegen

- Fairs attended in 2022 so far : IFH Nürnberg
- Fairs under discussion in 2022 : E-World & SHK Essen, light + building Frankfurt, Chillventa Nürnberg, BELEKTRO Berlin, GET Nord Hamburg



Pathway to a Competitive European
Fuel Cell micro-CHP Market

A large, light gray stylized house graphic that serves as a background for the right side of the slide. It has a simple roofline and a chimney on the left side.

SOLIDpower

BLUEGEN BG-15

Technical Specification	BLUEGEN BG-15
Fuel cell type	SOFC
Operational mode	Electricity-led
Electrical output	Up to 1.5 kW
Thermal output	Up to 0.85 kW
Electrical efficiency	Up to 57%
Overall efficiency	Up to 90%
Fuel flexibility	H Gas, L Gas, Green –gas, 20% H2 ready
On-off cycles	6 cycles /year+ modulation
Stack lifetime	40 000h
System life	15 years

BLUEGEN

- Improved stack-design (G8 Stack)
- Power modulation
- One touch (reduced) maintenance
- Close cascading
- Front service door
- App controlled by customer
- Increased thermal performance
- Higher total efficiency

Technical Overview



SOLIDpower





- Container for outside installation
- BLUEGEN installed with connections made and tested for Flue system, Heat recovery, Power supply, Main water, Drain water



Product Highlights

SOLIDpower



STANDARD PRODUCT

Standard BG-15 are installed in the container



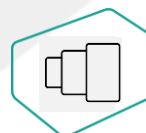
LIGHTWEIGHT

Custom-made container for easy handling on site



SAFETY

safety components against overheating and frost protection built in



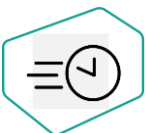
4 VERSION

4 different sized available - from 4,5 to 14 kW_{el}



READY TO USE

All components inside the container are installed



FAST INSTALLATION

No installation room needed – rapid installation

STACK MANUFACTURING FACILITIES

LARGEST INDUSTRIAL PRODUCTION PLANT IN EUROPE



FABRICATION OF CELLS AND STACKS
WITH HIGH AUTOMATED MANUFACTURING



25 MW CAPACITY
SUITABLE FOR 50 MW EXTENSION



>100 t/year
ceramic powder



924.000
Cells/year



60
Stacks/day



Key marketing materials

	United Kingdom	Germany	Italy
Website	Website ENG	Website GER	Website ITA
Brochure	Brochure ENG	Brochure GER	only offline
Booth	Yes	Yes	Yes
Rollups	Yes	Yes	Yes
Other	Yes	Yes	Yes

Key actions

Shows, PR Activities, Newspaper Ads, Online Ads (Google, Facebook, Xing, LinkedIn),
Offline Mailings, Lead Campaigning, Customer Marketing Support

Further Resources



SOLIDPower





Pathway to a Competitive European
Fuel Cell micro-CHP Market



25/07/2022

A large, light gray, stylized house graphic that serves as a background for the Sunfire text. It has a simple roofline and a chimney on the left side.

Sunfire

Sunfire-Home 750

Technical Overview

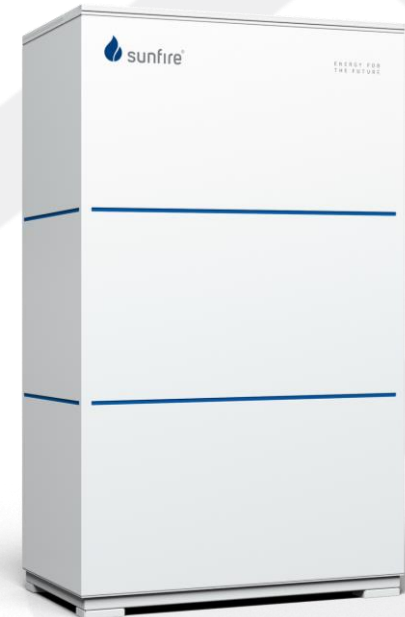
Sunfire

Technical Specification	Sunfire-Home 750
Fuel cell type	SOFC
Operational mode	Heat-led
Electrical output	0.75 kW
Thermal output	1.25 kW [+ peak boiler]
Electrical efficiency	38 % _{H_i}
Overall efficiency	88 % _{H_i}
Fuel flexibility	LPG, H Gas, L Gas, H2 ready
On-off cycles	1 cycle/ 1,000 h
Stack lifetime	40 000 h
System life	15 years

- Higher power density stack with improved materials, new design and increased lifetime
- Full stack integration leading to cost reduction and a more compact design
- New materials/ components for insulation, blowers and burners for higher efficiencies and lower cost
- Casing with fewer interfaces and integrated controls for easy installation



Sunfire-Home 750



The Sunfire logo, consisting of a blue flame icon followed by the word "sunfire" in a lowercase, sans-serif font.

Sunfire-Home 750

- Operation with liquid gas (propane/butane) and therefore a clean alternative to fuel oil.
- Heat extraction also possible at high return temperatures (up to max. 65 °C). Ideal for existing buildings.
- Continuous operation possible, as no regeneration times are required.
- "Made in Germany" - from development to the finished product

Sunfire-Home in Action



Key marketing materials

	Germany	United Kingdom
Website www.sunfire-home.de	German	English (planned)
Factsheet	German	English
Application Sheet	German	English (planned)
Warranty Sheet	German	English (planned)
Video	German	English (planned)

Key marketing events

- Series of webinars
- Enhanced use of google-ads
- Joint campaign with LPG supplier (online, via their sales team and installer partner network)



Pathway to a Competitive European
Fuel Cell micro-CHP Market

A large, light gray, stylized house graphic that serves as a background for the right side of the slide. It has a simple roofline and a vertical line for the left wall.

Viessmann

Vitocalor PT2

Technical Specification	Vitocalor PT2 / PA2
Fuel cell type	PEM
Operational mode	Heat-led
Electrical output	0,75 kW
Thermal output	1,1kW [PT2:11/19/26/32]
Electrical efficiency	38 %
Overall efficiency	92 %
Fuel flexibility	H Gas, L Gas, H2 ready up to 5%
On-off cycles	4000 cycles
Stack lifetime	80 000 h
System life	12 years

- Enlargement of Stack lifetime from 10 to 12 years
- Enlargement of Stack lifetime from 70.000 to 80.000 hours
- Decrease of maintenance effort from 2 to 5 years
- Increase of overall efficiency by 2% points to 92%
- Max. continuous operation until regeneration stop increased from 22 to 45 h

Technical Overview



Vitocalor PA2

Vitocalor PT2



Vitovvalor PT2

- First fuel cell mCHP on fuel cell base for single and double family houses in Europe
- Producing your own energy at home
- Get independent from rising electricity prices
- Up to 50% CO2 savings

[Video](#)



Vitovvalor PA2

- Retrofit existing heating system to generate own power
- High degree of independence from the public electricity grid
- Environmentally-friendly – significant CO2 savings
- Low maintenance costs thanks to long maintenance intervals (5 years)
- 10-year service package guarantees reliable operation

[Video](#)

Product Highlights





Key marketing materials

	Austria	Belgium	France	Germany	United Kingdom
Website	Product Website Vitovalor Viessmann AT	Product Website Vitovalor Viessmann BE	Product Website Vitovalor Viessmann FR	Product Website Vitovalor Viessmann DE Vitovalor PT2 Vitovalor PA2	Product Website Vitovalor Viessmann UK
Brochures	Brochures Viessmann Vitovalor AT	Brochures Viessmann Vitovalor BE	Brochures Viessmann Vitovalor FR	Brochures Viessmann Vitovalor DE	Brochures Viessmann Vitovalor UK Enduser Brochures Viessmann Vitovalor UK Installer
References	Reference Viessmann Vitovalor AT		https://youtu.be/FBoYSWJ4Jms	Customer Experiences DE	Customer Experiences UK
Videos	Video Viessmann Vitovalor AT Youtube	Video Viessmann Vitovalor BE Youtube	Video Viessmann Vitovalor BE Youtube	Video 1 Viessmann Vitovalor DE Youtube Video 2 Viessmann Vitovalor DE Youtube Video 3 Viessmann Vitovalor DE Youtube Video 4 Viessmann Vitovalor DE Youtube	Video 1 Viessmann Vitovalor UK Youtube Video 2 Viessmann Vitovalor UK Youtube Video 3 Viessmann Vitovalor UK Youtube Video 4 Viessmann Vitovalor UK Youtube



Pathway to a Competitive European
Fuel Cell micro-CHP Market

HEXIS

25/07/2022

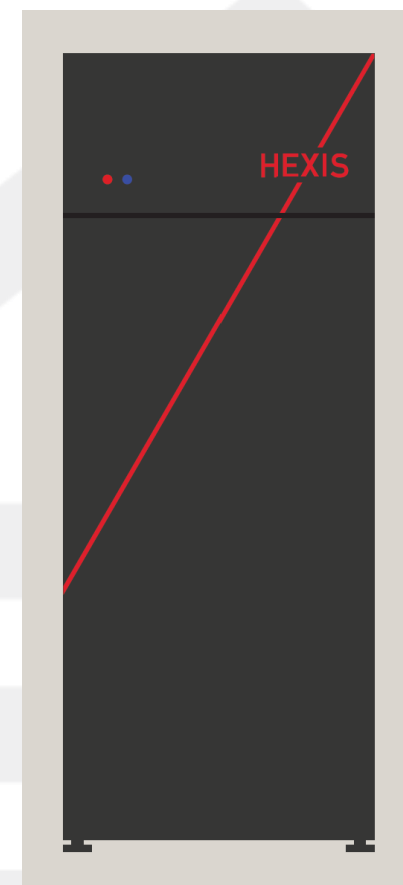
A large, light gray, stylized house graphic that serves as a background for the text on the right side of the slide. It has a simple roofline and a vertical line for the chimney area.

Hexis
Leonardo

Technical Specification	Leonardo
Fuel cell type	SOFC
Operational mode	Heat-led modulation 25-100%
Electrical output	1.5 kW
Thermal output	2.1 kW
Electrical efficiency	40%
Overall efficiency	95%
Fuel flexibility	H Gas, L Gas, Bio natural gas
On-off cycles	Continuous and modulating operation, 1/1000h cycles possible
Stack lifetime	40'000 h
System life	15 years

- High overall efficiency of 95%
- Wide modulation range of 25-100% allows flexible operation and long operation times
- H2 readiness is work in progress and available as kit by end of 2022
- Simple remote access for different levels: service partner, end-customer, Hexis
- Cascadable: multiple fuel cells or peak load devices

Leonardo

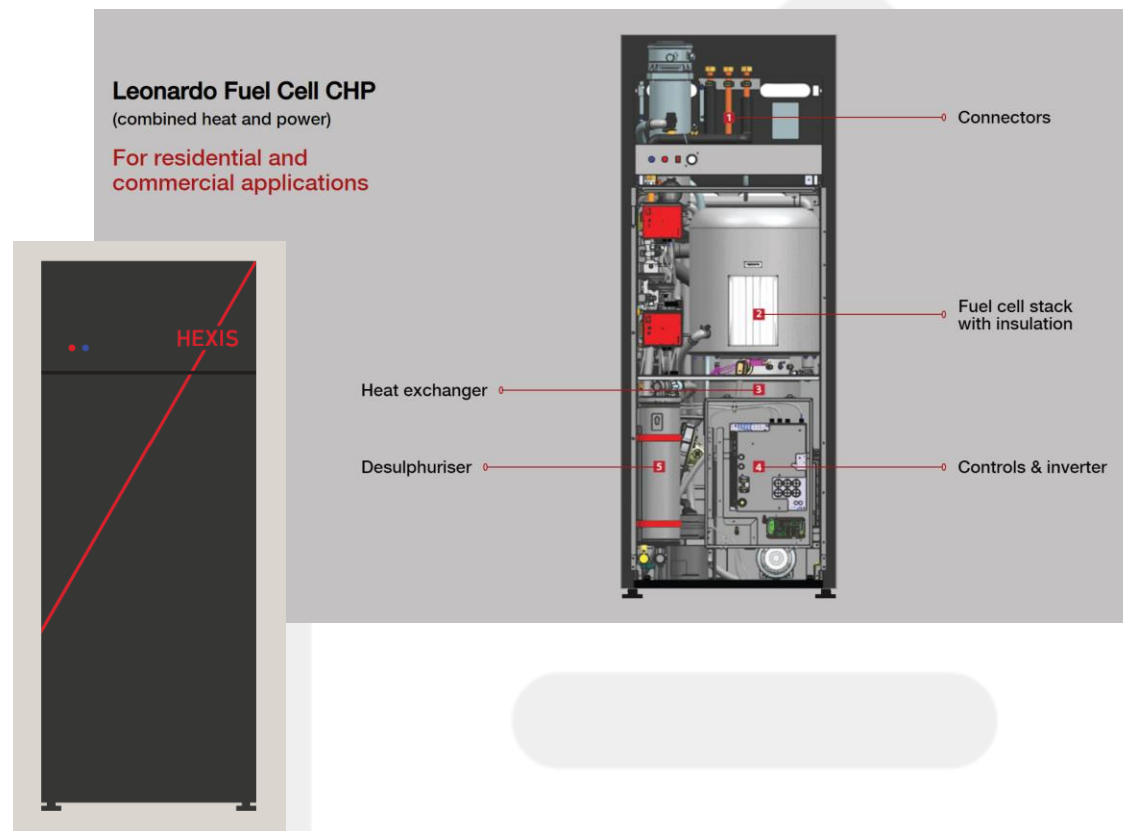


Leonardo

- 1.5 kW electrical power, modulating
- Up to 13'000 kWh electricity per year
- Up to 20'000 kWh heat usable for hot water and heating
- Efficient and cost-effective energy directly on site
- Complies with EnEV and EwärmeG
- Simple integration into an existing heating system
- Operation of the fuel cell even at return temperatures of up to 70°C
- Ideal for modernisation and renovation
- Cascadable with peak-load heaters up to 200 kW

Product Highlights

HEXIS



Key marketing materials

	Germany	United Kingdom (English version)	Belgium	France
Website	HEXIS - Exzellenz in Brennstoffzellen	HEXIS - Excellence in fuel cells		
Brochures	Hexis EK Broschuere	Hexis EC brochure		



Pathway to a Competitive European
Fuel Cell micro-CHP Market

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