



BAXI GROUP

delivering the spark

# Baxi Group - key facts

- Market position

- No.3 European Heating Group
  - 4,200 employees
- Market leader in the UK, Spain, Russia & Ukraine
- Significant positions in Italy, France, Germany, Turkey and emerging markets

- Products & Services

- Focus on heating primarily on boilers with significant market shares in water heaters, radiators and gas fires
  - 950,000 boilers sold each year
- ***Leading innovator and technological leader***



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BAXI

POTTERTON

MAIN

POTTERTON  
COMMERCIAL



ANDREWS  
WATER HEATERS



valor

HEATRAE SADIA

SANTON



DACHS

BAXI  INNOTECH  
fuel cell heating

heateam

interpart



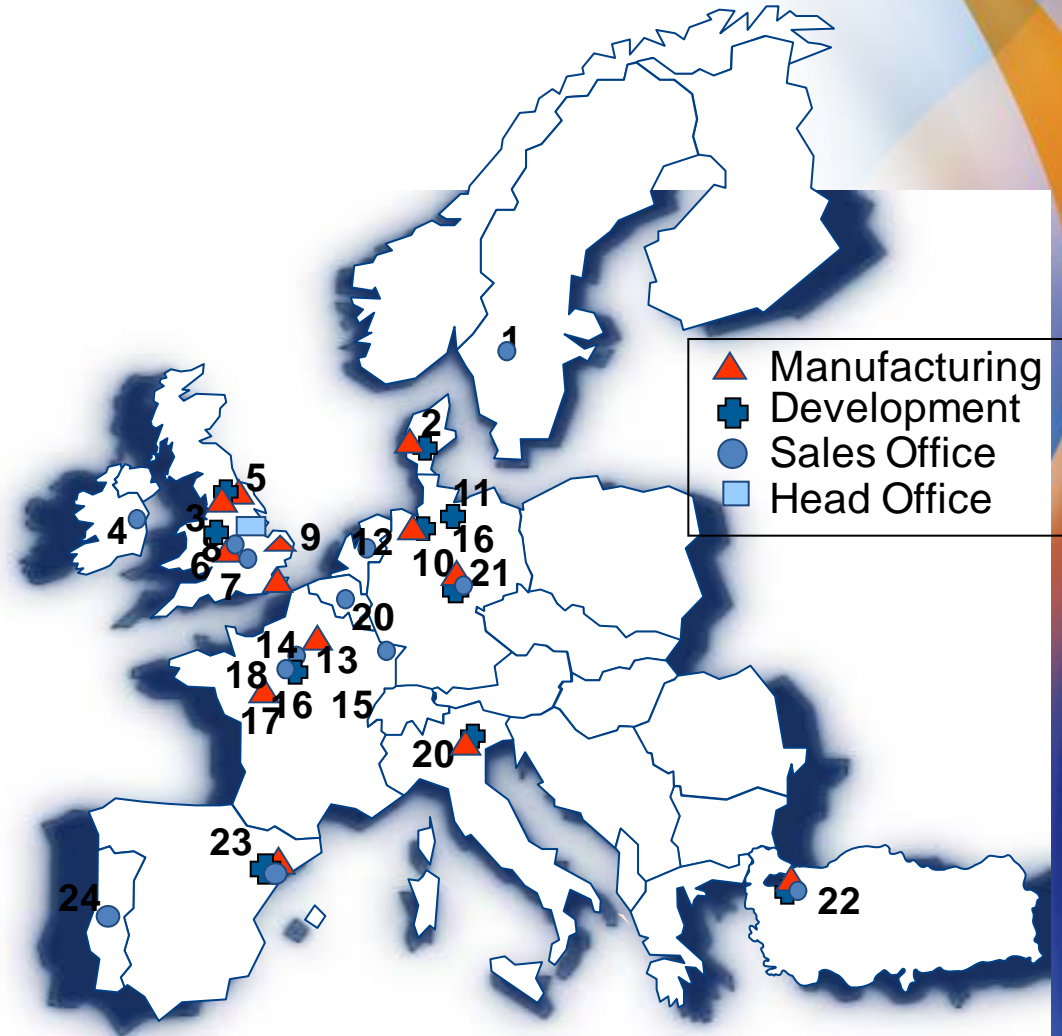
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elson

# Locations in Europe

- 1 Falköping, Sweden - Baxi
- 2 Tarm, Denmark - Baxi
- 3 Preston, Great Britain - Baxi Heating UK**
- 4 Dublin, Ireland - Baxi Heating UK
- 5 Derby, Great Britain - Head Office
- 6 Birmingham, Great Britain - Valor/Baxi Fires
- 7 Birmingham, Great Britain - Andrews
- 8 Warwick, Great Britain – Baxi Heating UK
- 9 Norwich, Great Britain - Heatrae Sadia
- 10 Rastede, Germany - Brötje
- 11 Nijkerk, Netherlands- Baxi - Sentry/Rodiac
- 12 Braine, Belgium – Baxi Belgium
- 13 Villers Cotterets, Baxi France
- 14 Le Blanc Mesnil, Baxi France
- 15 La Chartre, Baxi France
- 16 Hamburg, Germany – Baxi Innotech**
- 17 Bischoffsheim, Baxi France
- 18 Soissons, Baxi France - Ideal Standard/Chappee
- 19 Pessac, Baxi France
- 20 Bassano, Baxi Italy
- 21 Schweinfurt, Germany- SenerTec**
- 22 Istanbul, Turkey – Baymak
- 23 Barcelona, Spain – Baxi Roca
- 24 Colmeias, Portugal – Baxi Roca

Outside Europe: Russia, China



# Locations in UK



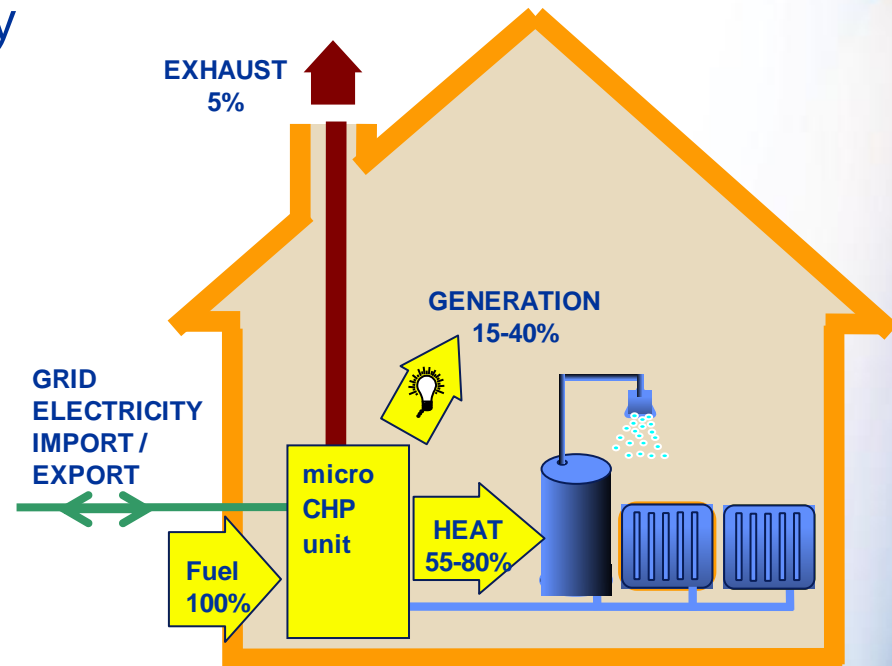
# Low Carbon Range Technologies



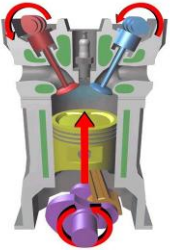


# The benefits of micro CHP

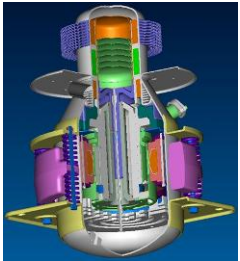
- Better efficiency through local generation of energy and displacement of primary energy from grid network
- Feeling of independence from electricity network
- Fuel savings for the end user
- Carbon savings for the end user and for Governments to achieve carbon targets



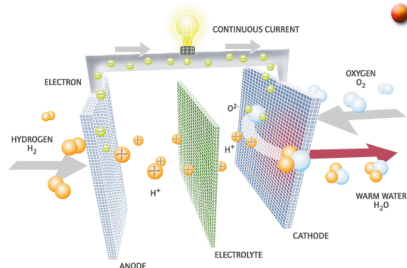
# Baxi micro CHP



- Use in light commercial and large residential applications
  - Baxi SenerTec Dachs
  - Functional principle: internal combustion engine
  - Performance data:  $5,5 \text{ kW}_{\text{el}}$ ,  $12,5 \text{ kW}_{\text{th}}$  (CHP)
  - Auxiliary heating device:  $15,0 \text{ kW}_{\text{th}}$



- Wall hung mCHP appliance for use in residential applications
  - Baxi Ecogen
  - Functional principle: Stirling engine (linear free piston Stirling engine)
  - Performance data  $1,0 \text{ kW}_{\text{el}}$ ,  $6 \text{ kW}_{\text{th}}$
  - Auxiliary heating device:  $18 \text{ kW}_{\text{th}}$



- Floorstanding Application in residential applications
  - Baxi Innotech Fuel cell heating unit
  - Functional principle: PEM fuel cell
  - Performance data:  $1 \text{ kW}_{\text{el}}$ ,  $1,7 \text{ kW}_{\text{th}}$
  - Auxiliary heating device:  $15,0 \text{ kW}_{\text{th}}$

TODAY

TOMORROW



# Baxi Dachs – Technical Data

- 5.5kWe gross electrical output
- 12.5kW heat output
- Overall efficiency of 80% - 92%
- Dimensions – 720mm(W) x 1090mm(D) x 1000mm(H)
- Gas and fuel oil options available (Bio Diesel)
- Energy cost savings
- Reduction of electricity normally imported from grid
- Good electrical export potential
- Savings of over 5 tonnes of CO<sub>2</sub> per year



# Baxi CHP Products

## DACHS mini-CHP Unit

Over 20,000 units across Europe

Over 250 units in UK

### Applications

- Sheltered housing schemes
- Extra care schemes
- Social housing developments
- NHS Trust nursing home
- Community resource centres
- Police station
- Fire station
- University Sustainability Research Building
- Primary school
- Military accommodation blocks



# Ecogen Specification



Wall hung heating only suitable for open vented and sealed systems.

Electrical power:  $1 \text{ kW}_e$

Thermal power:  $3 - 24 \text{ kW}_{th}$

Total efficiency:  $> 90\%$

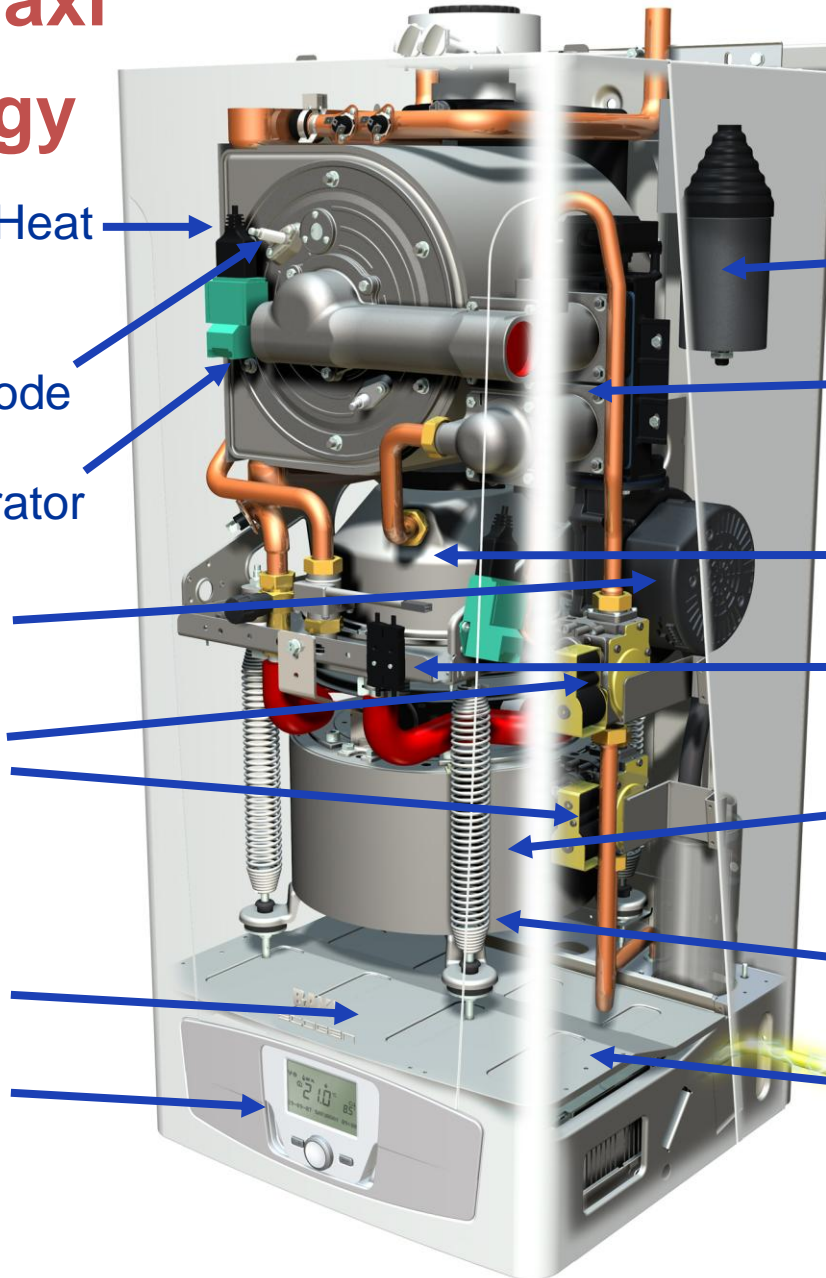
Dimensions:  $950h \times 450w \times 420d(\text{mm})$

Noise:  $45 \text{ dB(A)}$

Weight:  $110\text{kg}$

# Platform Baxi Technology

- Shell & Coil Heat Exchanger
- Spark Electrode
- Spark Generator
- Fan
- Gas Valves
- Sensors
- Controls
- HMI



# New Technology

- Capacitor  
Engine power discharge
- Spool Valve Assembly  
Distribute air from 1 fan between 2 burners
- Recuperator  
Channels engine flue gasses
- Mounting Bracket  
Cools engine seal
- Stirling Engine  
Uses heat to generate electricity
- Springs  
Eliminates vibration
- G83 Control  
Allows connection to grid



# Product Evolution

9 Units



**α-unit**

6 units on endurance test  
3 units on field test

29 Units



**β-unit**

6 units on endurance test  
13 units on field test

**α-unit**

8 units on endurance test  
2 units on field test

NL Build  
27 Field Trial.

116 Units



**PS-unit**

50 units on customer field trial  
9 units on R&D field trial  
10 units on endurance test

**α/β-unit**

14 units on endurance test  
6 units on field test

**Series  
Market  
launch**



# Gamma Fuel Cell specifications

## Technical data:

Electrical power:	1.0 kW <sub>el</sub> net
Thermal power:	1.7 kW <sub>th</sub>
Additional heat generator:	15 kW <sub>th</sub>
Total efficiency:	> 80%
Fuel pressure:	20-45 mbar
Grid connection:	230 Volt / 50 Hz
Dimensions:	~ 0.6 x 0.7 x 1.6 m
Noise:	< 55 dB(A)



*Field Trials currently on-going in the UK and Europe  
Birmingham University Hydrogen Faculty. Black  
Country Hsg.*

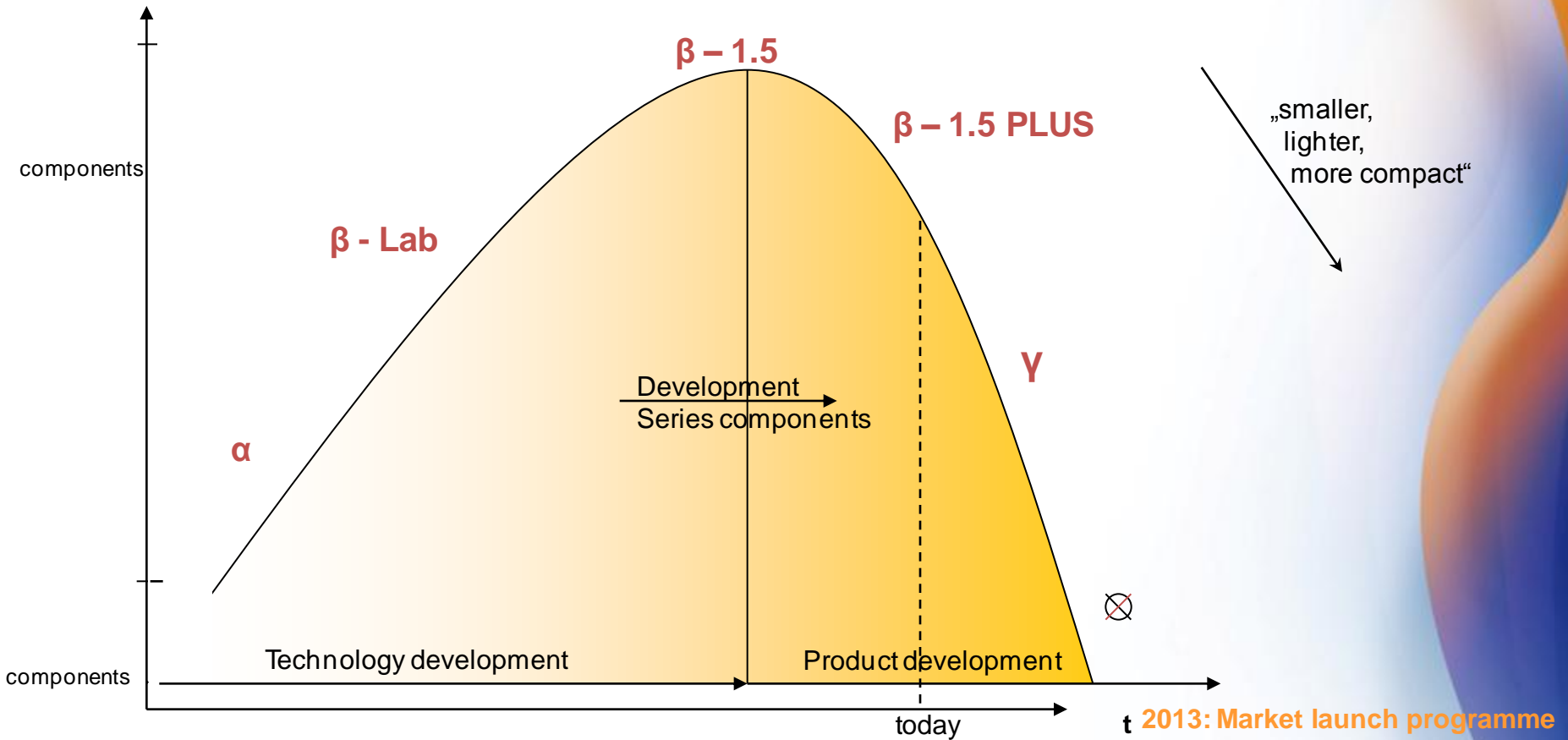


Development strategies



Field test conception

Product complexity



# Milestones of Fuel Cell Development



BETA Development  
2002 up to 2005

- Design of a field test-unit
- Targets:
- Cost reduction
- Operational performance
- Service and maintenance experience



BETA 1.5/  
BETA 1.5 PLUS  
2005 up to 2008

- Field trial together with gas and power utilities.
- 15 Units of the BETA 1.5 in 2006 in the field
- 30 Units of the BETA 1.5 PLUS in 2008 in the field trial
- Training & integration of installers.

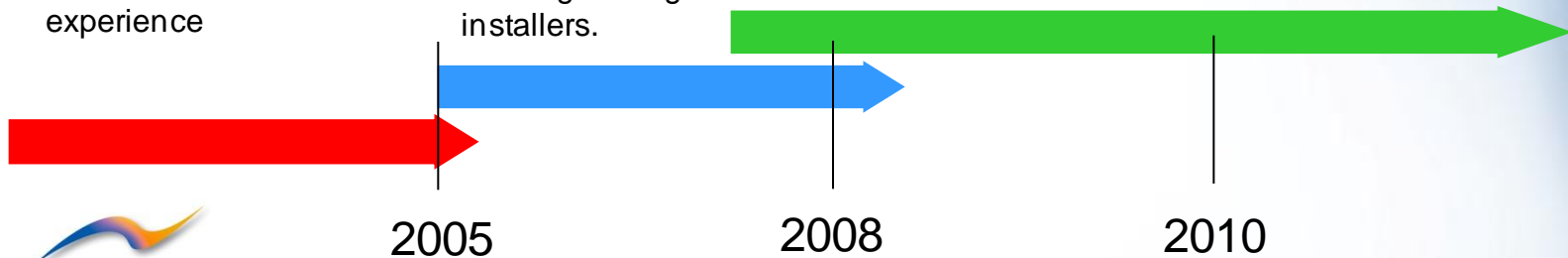


National Innovation Program (NIP) from 2008 up to 2012  
Demonstration program with German Utilities for market preparation and Market development in other European Countries



GAMMA Unit  
2010 up to 2012  
Pre-series for demonstration.  
Market entry program from 2012

**Series**  
Market entry 2013



# Combined Heat and Power - tomorrow's heating solution, tried and tested today

