



Baxi Innotech - Gamma 1.0

***Large scale demonstration of residential
PEFC systems in Germany***

- Status and outlook -

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Subsidied by:



Bundesministerium
für Wirtschaft
und Technologie



Bundesministerium
für Verkehr, Bau
und Stadtentwicklung

BAXI  **INNOTECH**
fuel cell heating

4th IPHE Workshop - Stationary Fuel Cells
1st March 2011
Tokyo, Japan

contents

- **Who we are**
„The company BDR Thermea“
- **μ-chp – a future market**
„High efficiency in the single family home“
- **Fuel Cell Heating Unit GAMMA 1.0**
„Current development status and next steps.“
- **Cooperative collaboration**
„The large scale demonstration“
- **Outlook**



Group key facts

No. 3 manufacturer of heating equipment in **Europe**

Leading brands in at least 6 major EU economies

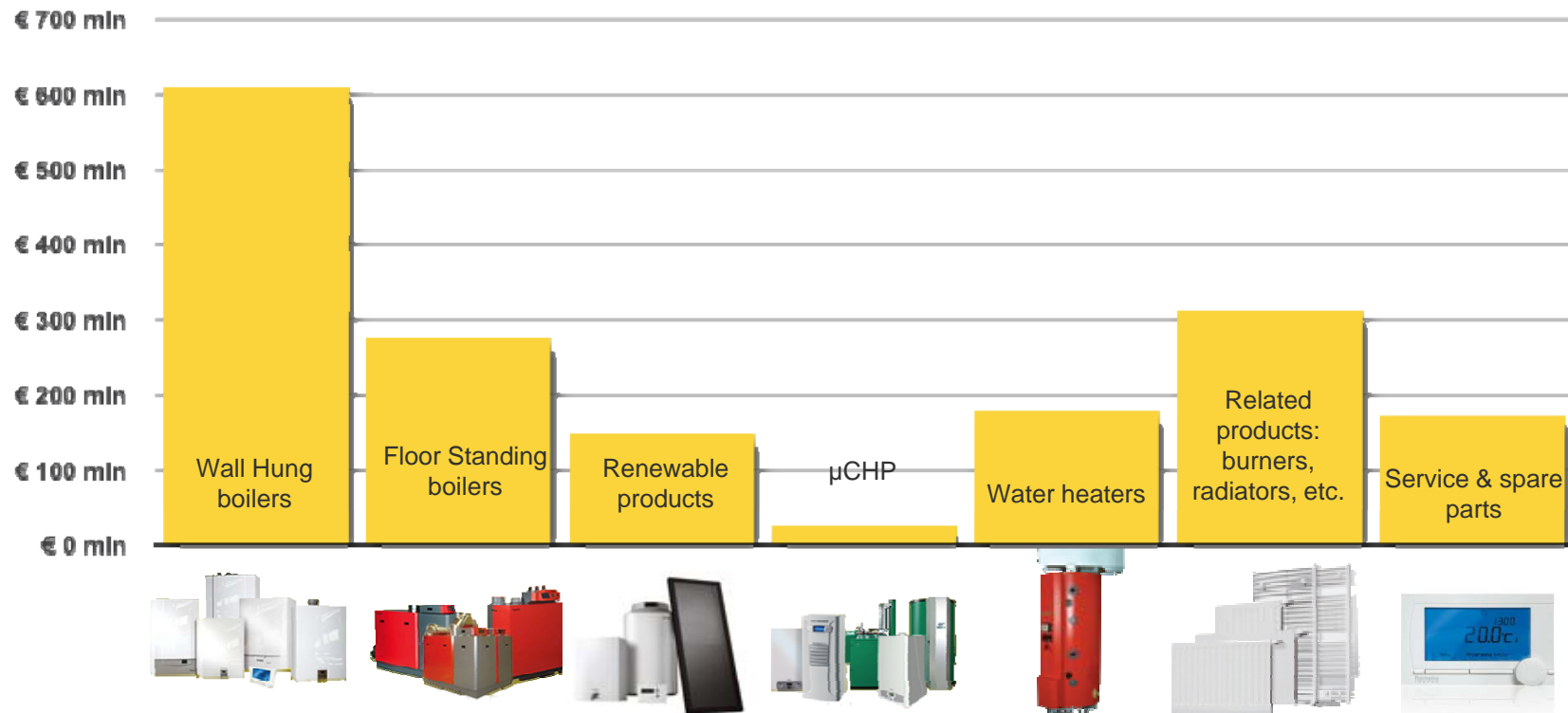
Sales revenues **€1.665 million** per annum (2009)

EBITDA €236 million (2009)

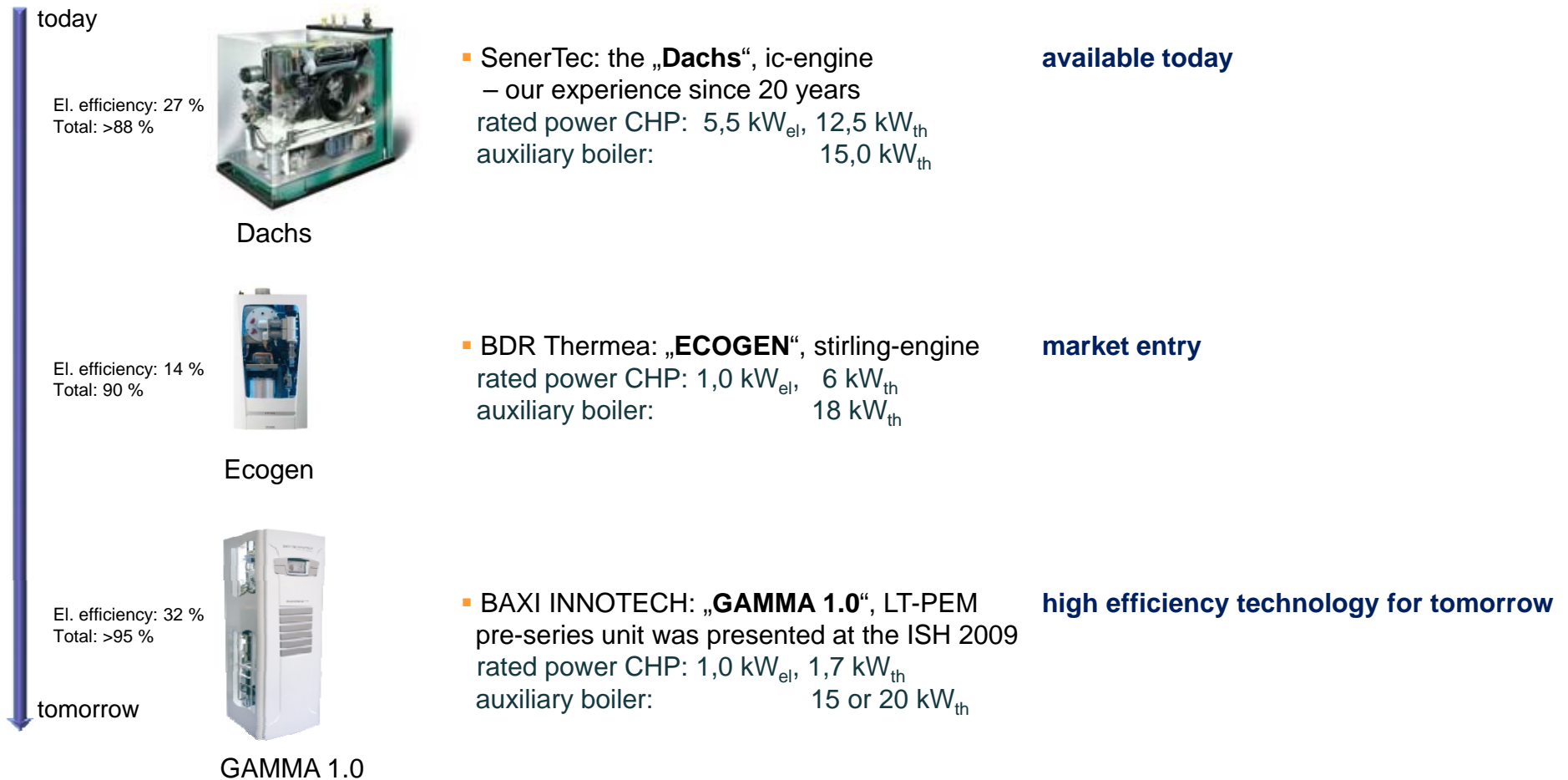
Approx. **6,400 people** (2009)

Production sites and sales offices **throughout Europe**

Sales by Product Segment (2008)

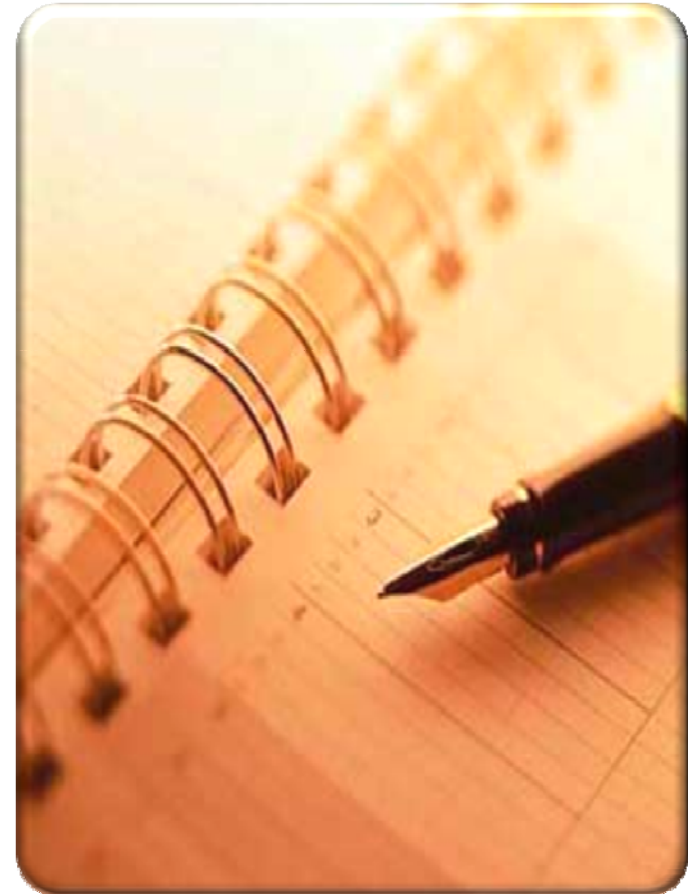


BDR Thermea: be first with μ chp

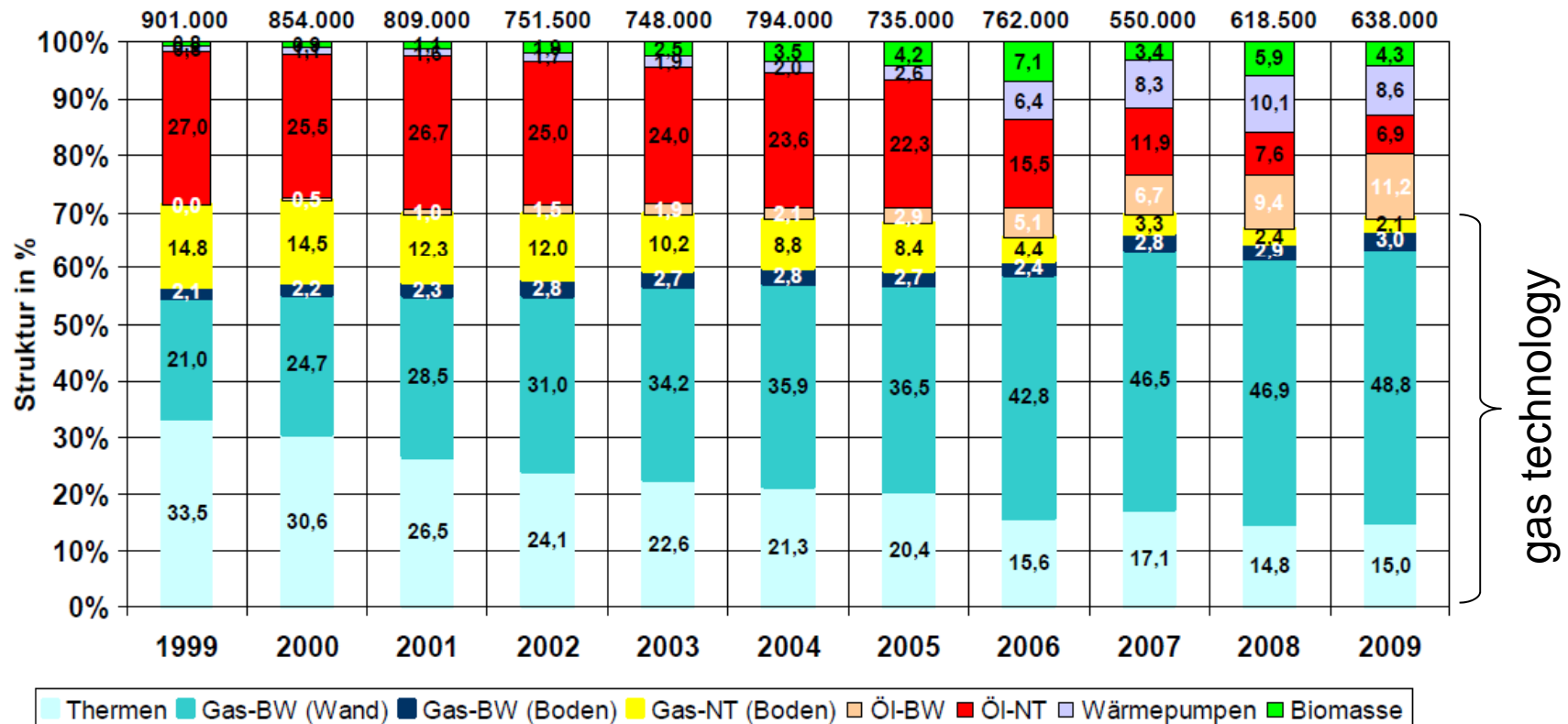


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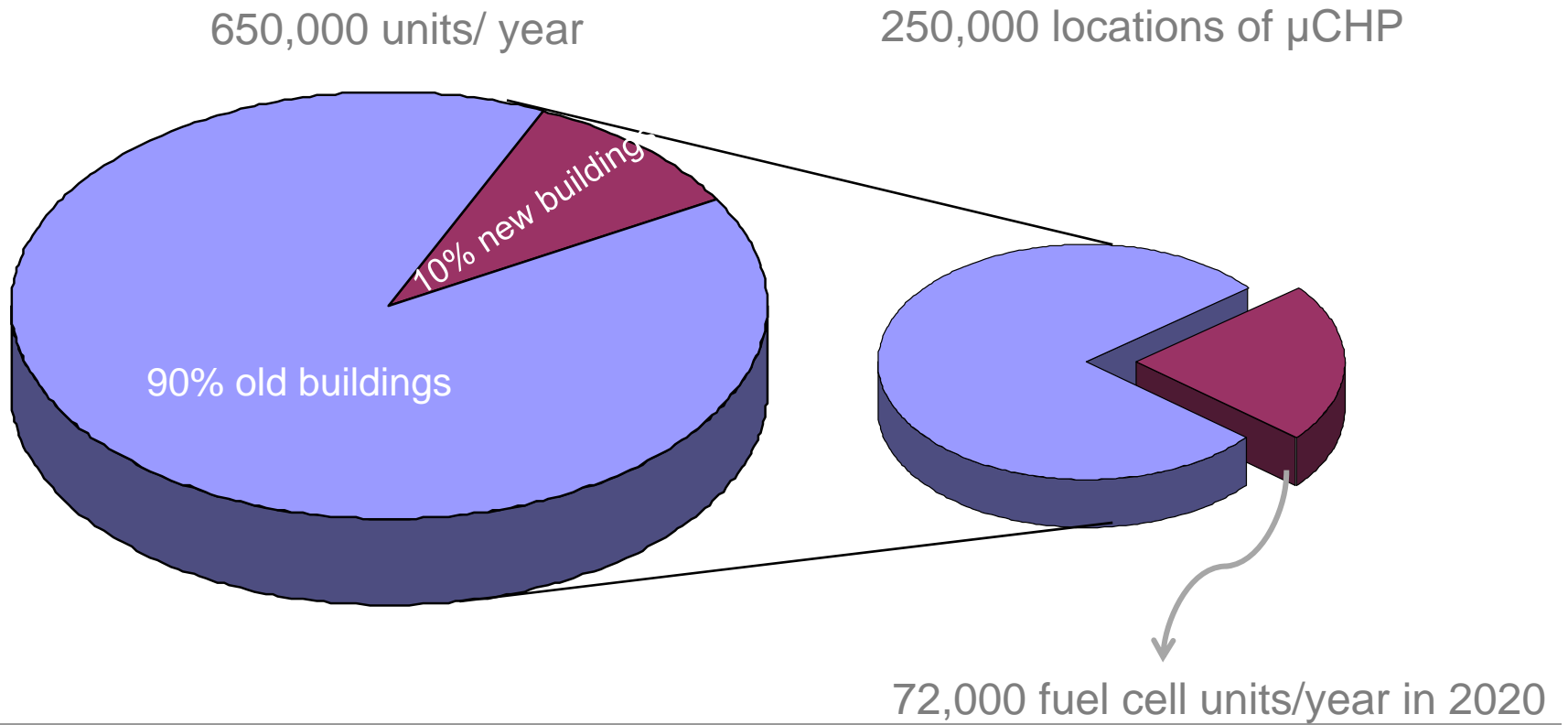
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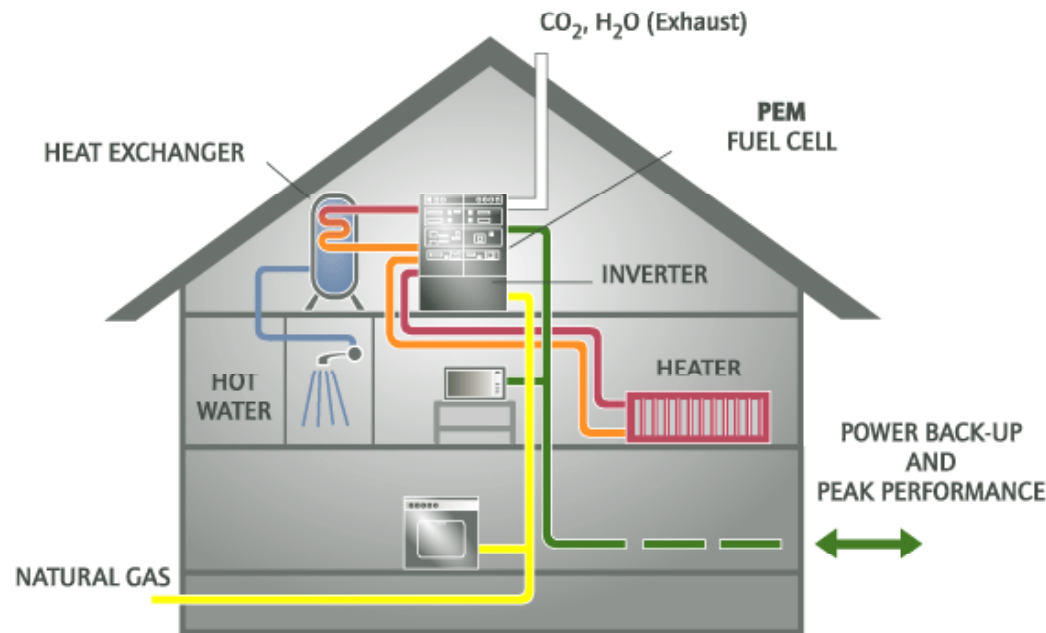
Market development for heat generators 1999 - 2009



Heating Market for fuel cell systems in Germany



Fuel cell heating CHP for single family homes with natural gas supply



The Micro CHP Fuel Cell Heating Unit supplies ...

... 100% of the heat demand of a single-family house

... and produces 5000-6000 kWh of electricity

... proportional coverage of up to 73% of the electrical consumption of the house.

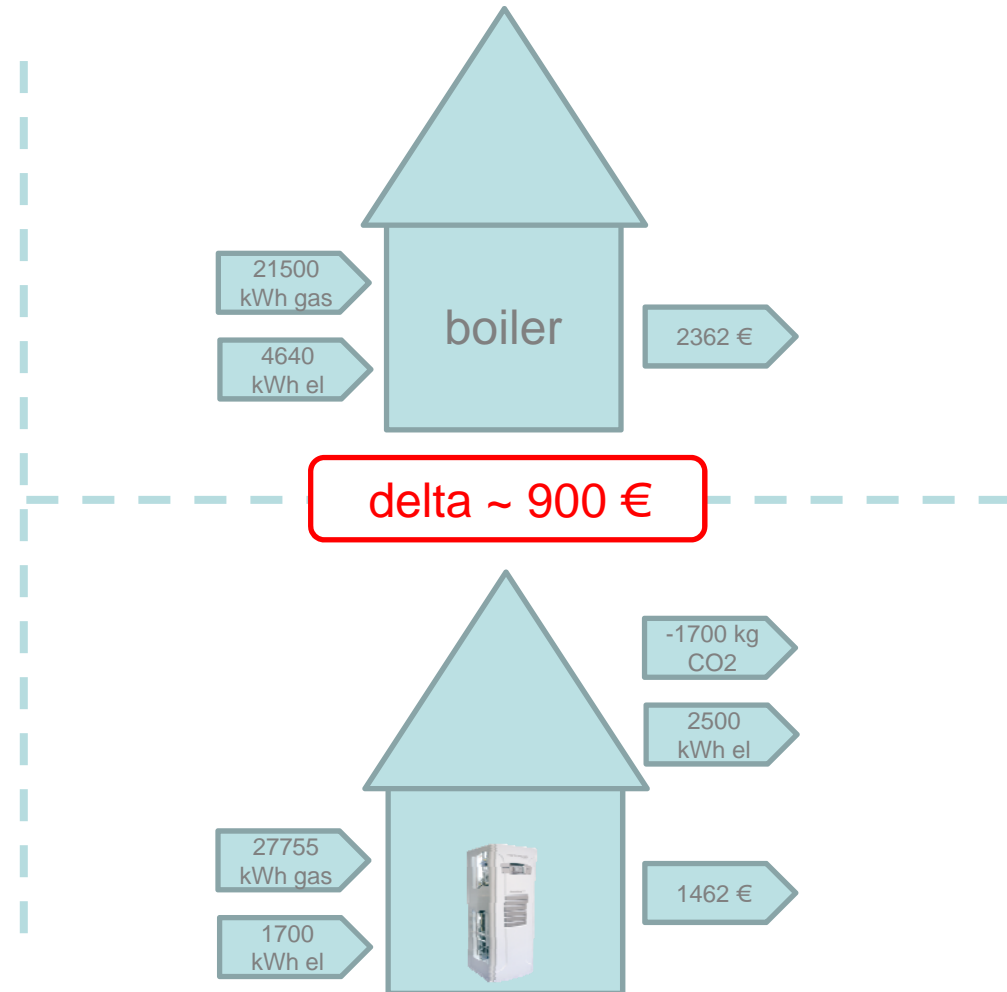
Basic economic comparison

Tabelle 1: Technische Daten der Gamma 1.0

Technische Daten	Gamma 1.0
Elektrische Nennleistung / kW	1,0
Thermische Nennleistung / kW	1,7
Thermische Nennleistung Zusatzheizgerät / kW	20
Elektrischer Wirkungsgrad	0,32
Thermischer Wirkungsgrad KWK-Teil	0,53
Thermischer Wirkungsgrad Zusatzheiz.	1,09

Tabelle 2: Übersicht Energiepreise

	Preis / ct/kWh
Erdgasbezug	6,09
Erdgassteuer	0,55
Strombezug	22,67
Stromeinspeisung:	
Gesetzliche Einspeisevergütung (auch für ins Hausnetz eingespeisten Strom)	5,11*2
Vermiedene Netznutzung	0,45
EEX Baseload-Preis	6,32

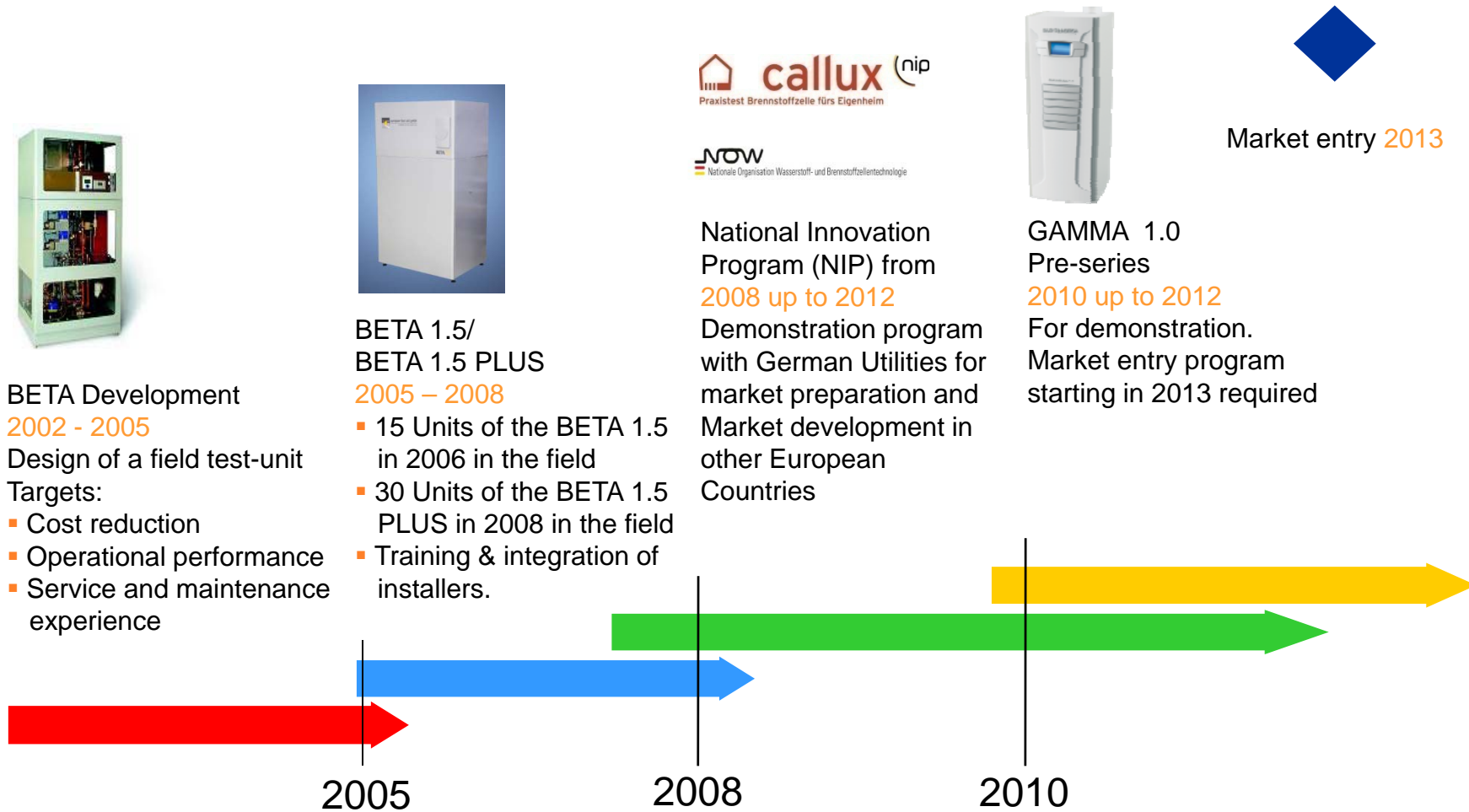


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Milestones of product design



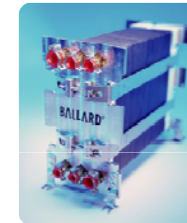
From BETA 1.5 PLUS to GAMMA 1.0: A vision is taking shape



The technical target values of the GAMMA 1.0

Combined Heat and Power (CHP) section

- | | |
|---|--|
| <ul style="list-style-type: none"> ■ Type ■ Performance (el/th) ¹⁾ ■ Modulation range ■ Fuel ■ Electrical efficiency (H_u) ■ Total CHP efficiency level ■ Operating mode | <p>low-temperature PEM fuel cell (60°C)
 max. 1.0 kW_{el} / 1.7 kW_{th}
 approx. 100 to 30% P_{elN}
 Natural gas
 32% (goal: 34%)
 85 %
 > 100 start-stop cycles /a</p> |
|---|--|



Integrated auxiliary boiler

- | | |
|--|--|
| <ul style="list-style-type: none"> ■ Type ■ Performance ■ Standard utilisation efficiency | <p>condensing boiler
 2.9 – 15 kW or 3.5 – 20 kW
 109 % (η_N with 40/30°C)</p> |
|--|--|



The Complete system

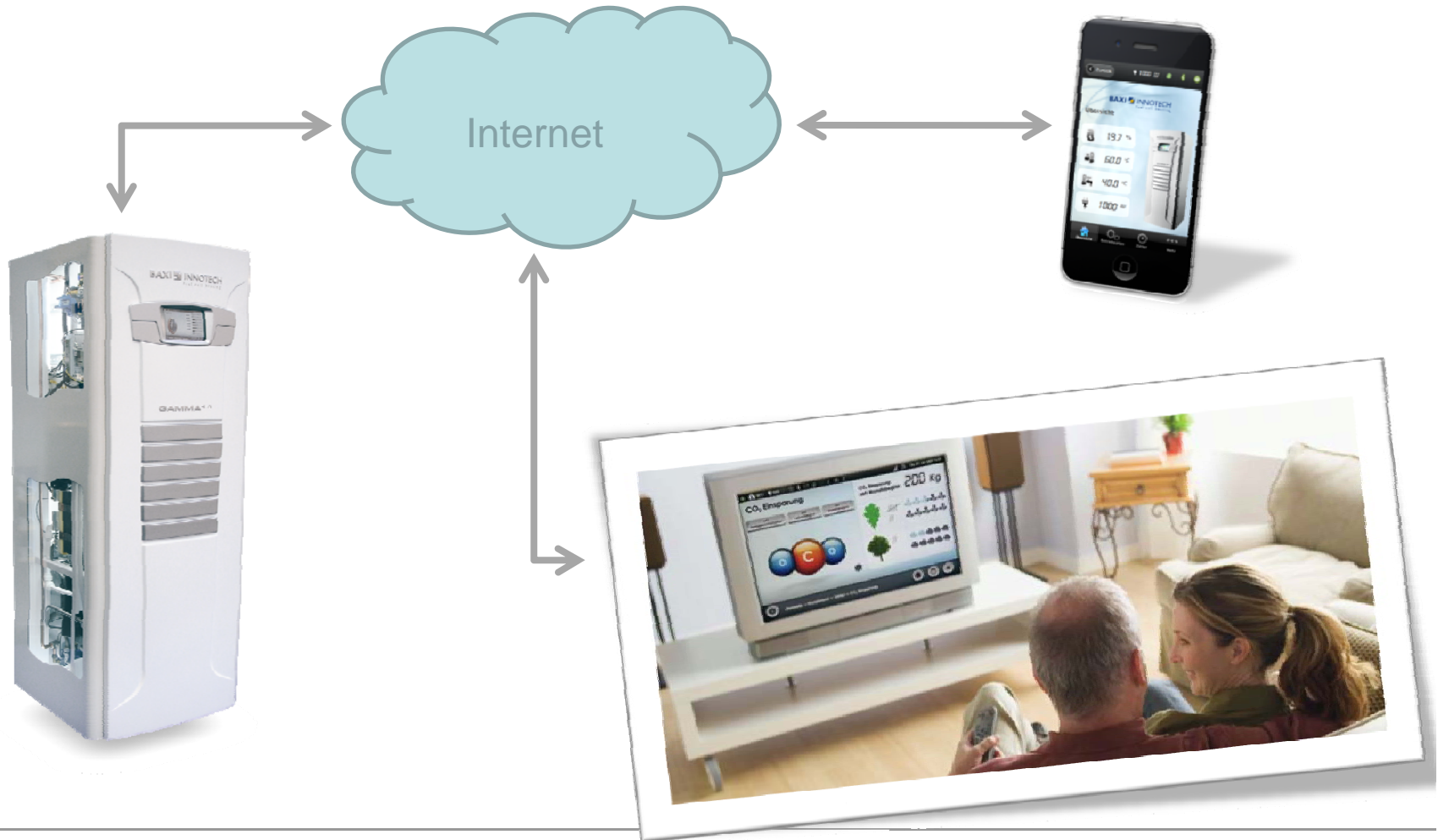
- | | |
|---|--|
| <ul style="list-style-type: none"> ■ Total efficiency level ■ Dimensions (w x d x h in mm) ■ Weight ■ Electrical connection ■ Operating hours / a ■ Type of operation | <p>> 95 % (at flow/ return 60/40°C)
 600 x 600 x 1600
 approx. 200 kg
 230 V / 50 Hz
 4000 – 6000h
 heat led, electricity led,
 controlled by the energy manager,
 centrally operated (virtual power plant)</p> |
|---|--|



1) H-Gas type

TODAY'S PARTNER IN TOMORROW'S WORLD

Increase in operational efficiency = visualizing performance and user behavior



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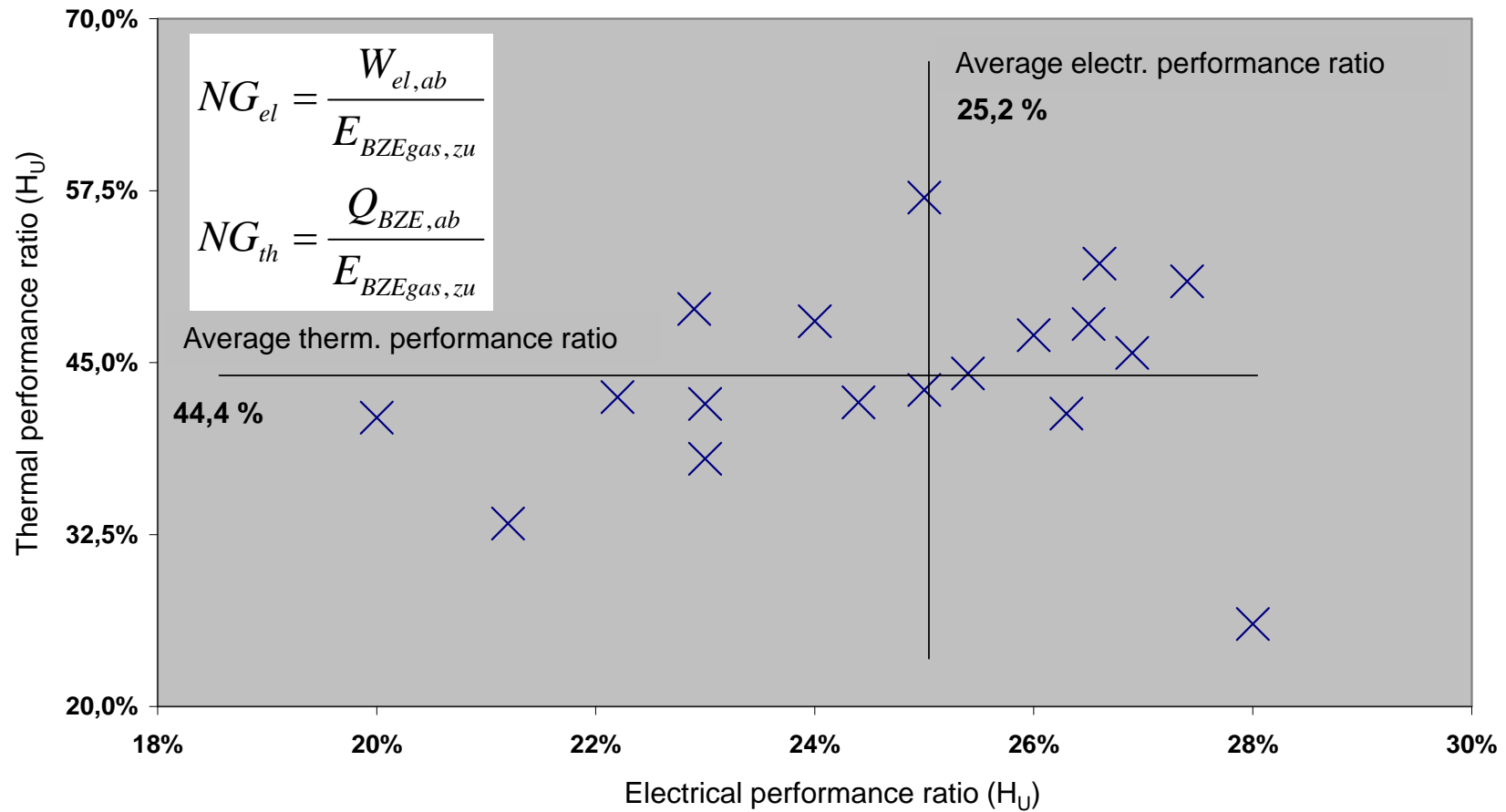




demonstration project Impressions EnBW

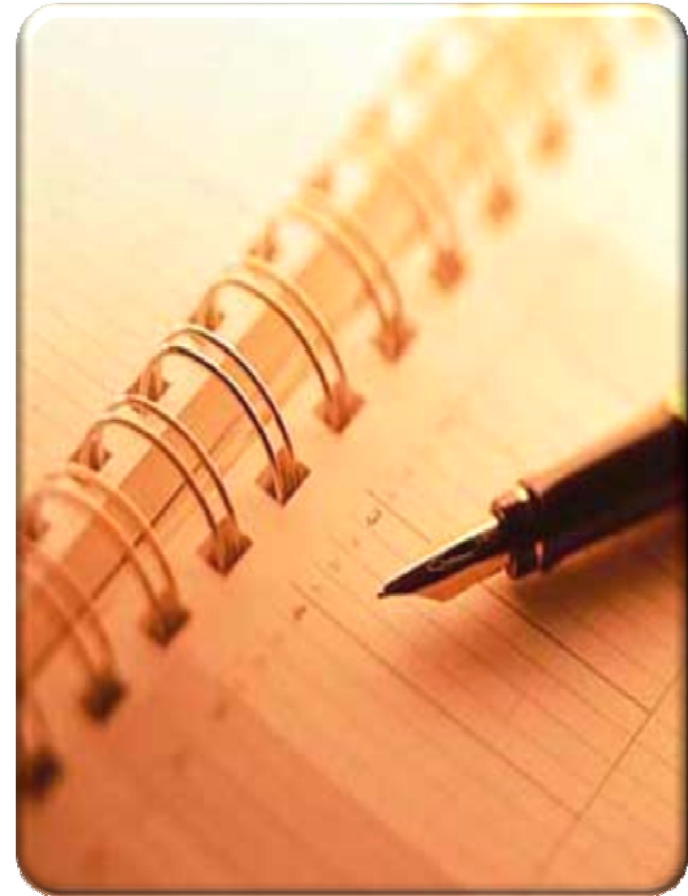


Average performance ratio of Gamma 1.0

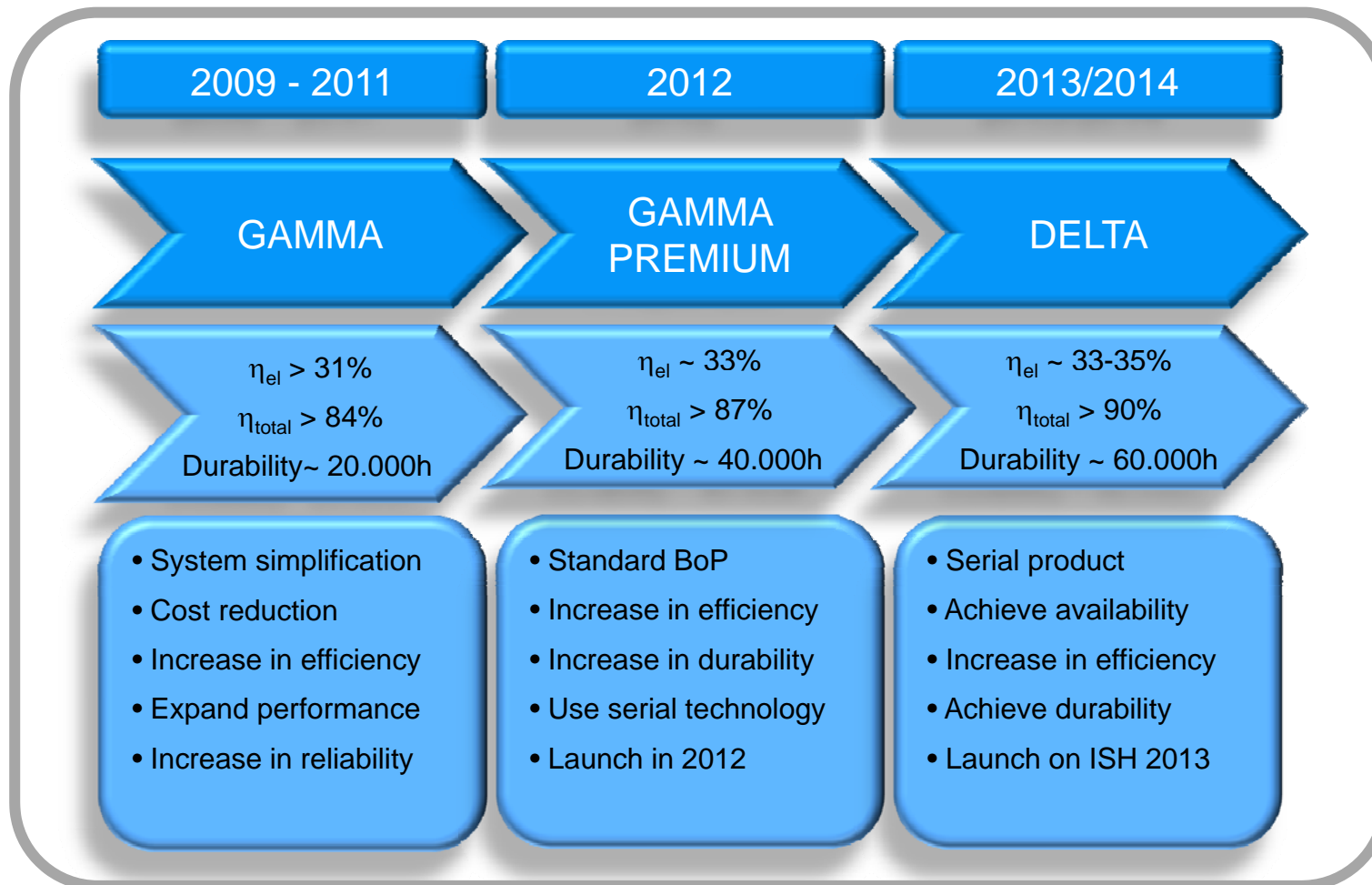


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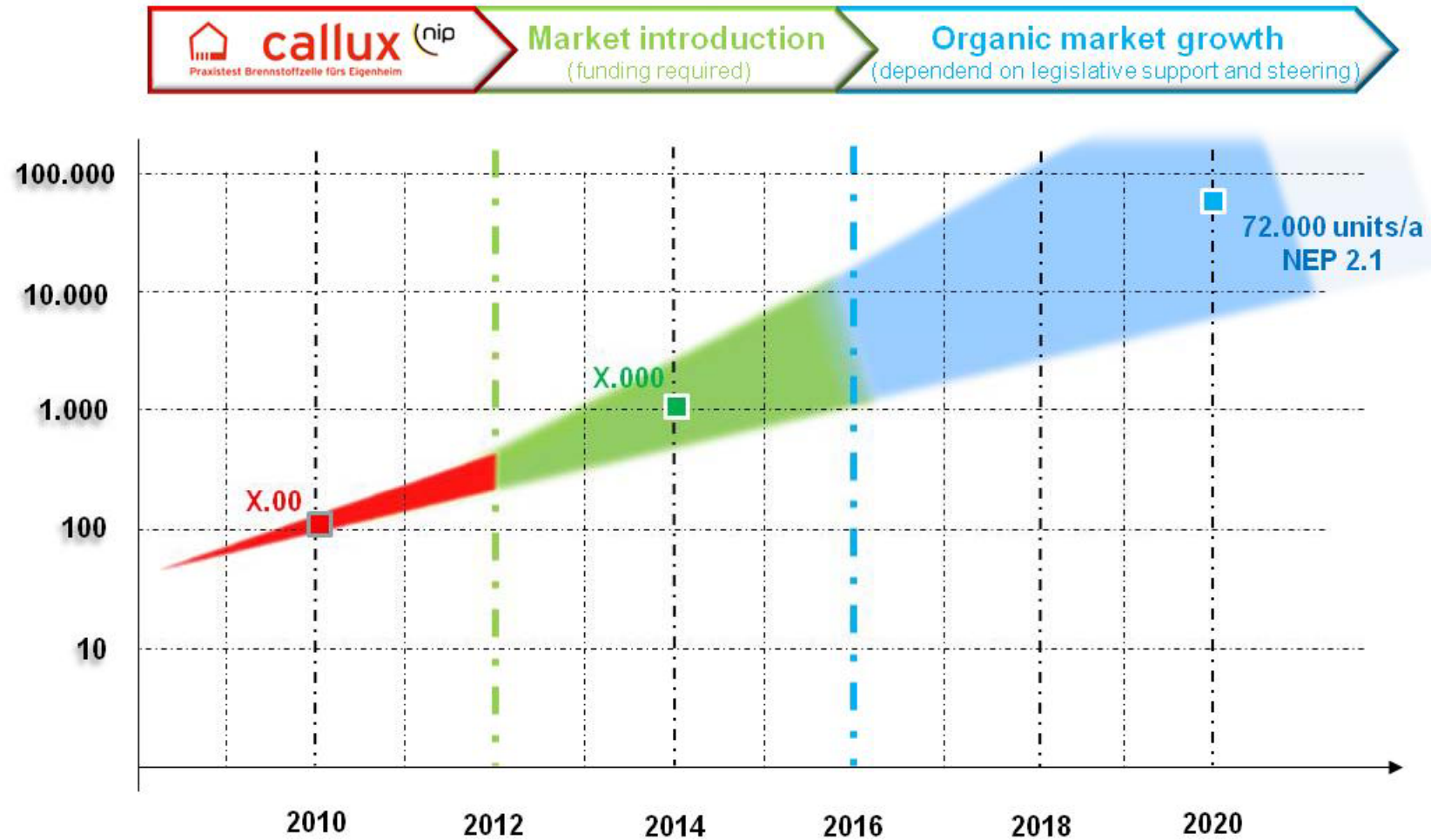
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Development road map Baxi Innotech



volume scenario for μ chp in Germany



Outlook ...

Key development issues

- Further increase in system robustness
- Proof of durability specification
- High emphasis on cost reduction

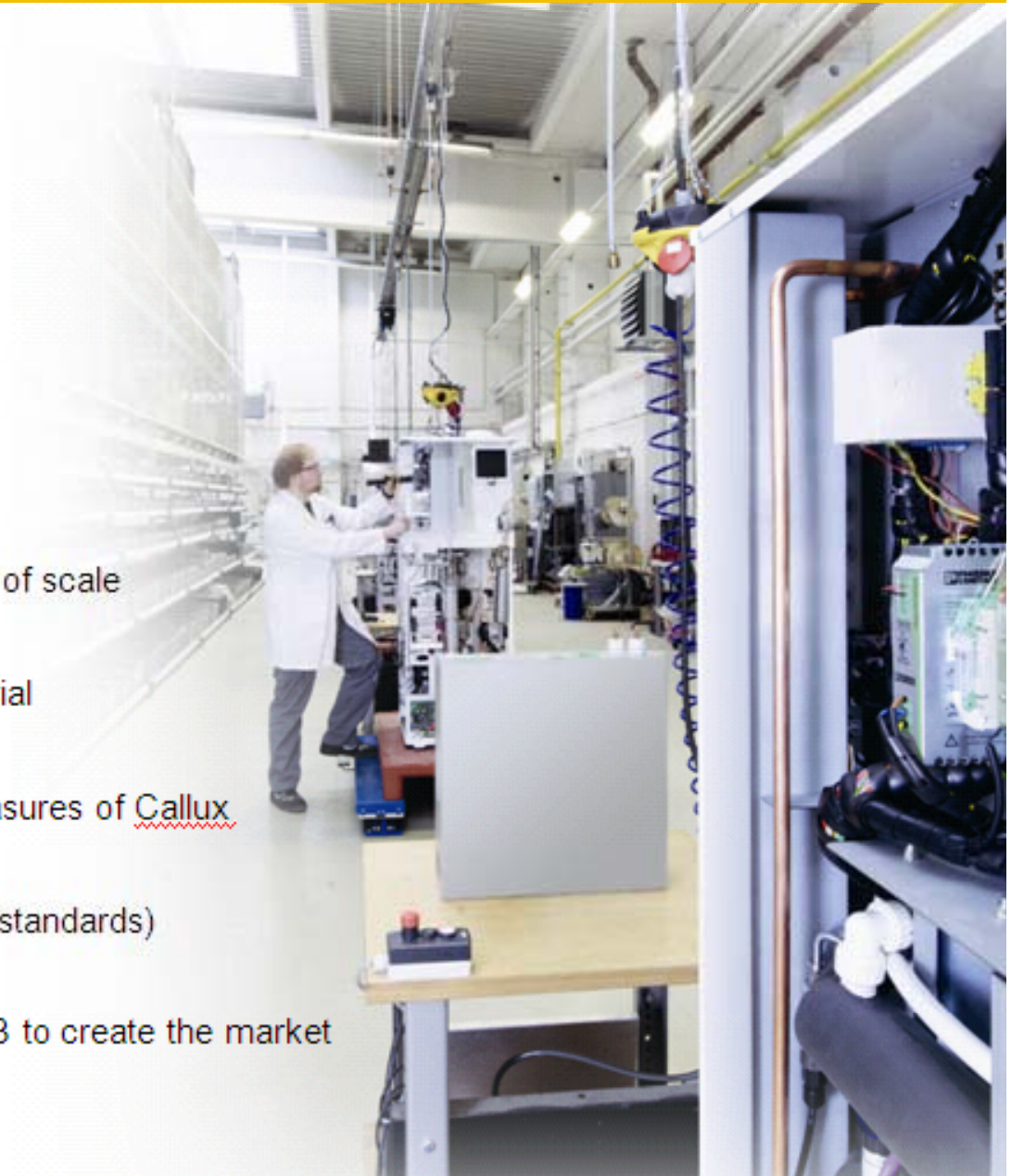
Set up supply chains to use economies of scale

2012 start of GAMMAPREMIUM field trial

Market preparation with supporting measures of Callux

Elimination of market barriers (codes & standards)

Further governmental support after 2013 to create the market



Thank you for your kind attention!

We like to thank all parties who are supporting the development of our fuel cell heating appliance:

- our development partners
- our suppliers
- the partners in the callux project and
- the NOW

as well as in particular

- the Federal Government of Germany



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