



# Ceramic Fuel Cells

## World Leader in Fuel Cell Technology

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## Investment Highlights

- Leading manufacturer and marketer of small scale fuel cells
- Converts natural gas into electricity and heat for homes and small buildings
- BlueGEN units achieve 60% electrical to 85% total efficiency
- First commercialised in 2010, circa 500 units sold to date
- 43% sales increase in 2014 with 210 units sold
- Major technical improvement - expected stack life increased to 5 years
- Manufacturing costs reduced by 29% per unit since 2012
  - Selected components manufactured in China
  - Core IP retained in Melbourne
  - Final assembly in Germany
- Sales strategy re-positioned to lower sales cost per unit
  - Focus on multi-unit sales - housing developments, council estates etc.
  - Sales forces in UK, Germany and the Netherlands

# Leading Producer of Fuel Cells Globally

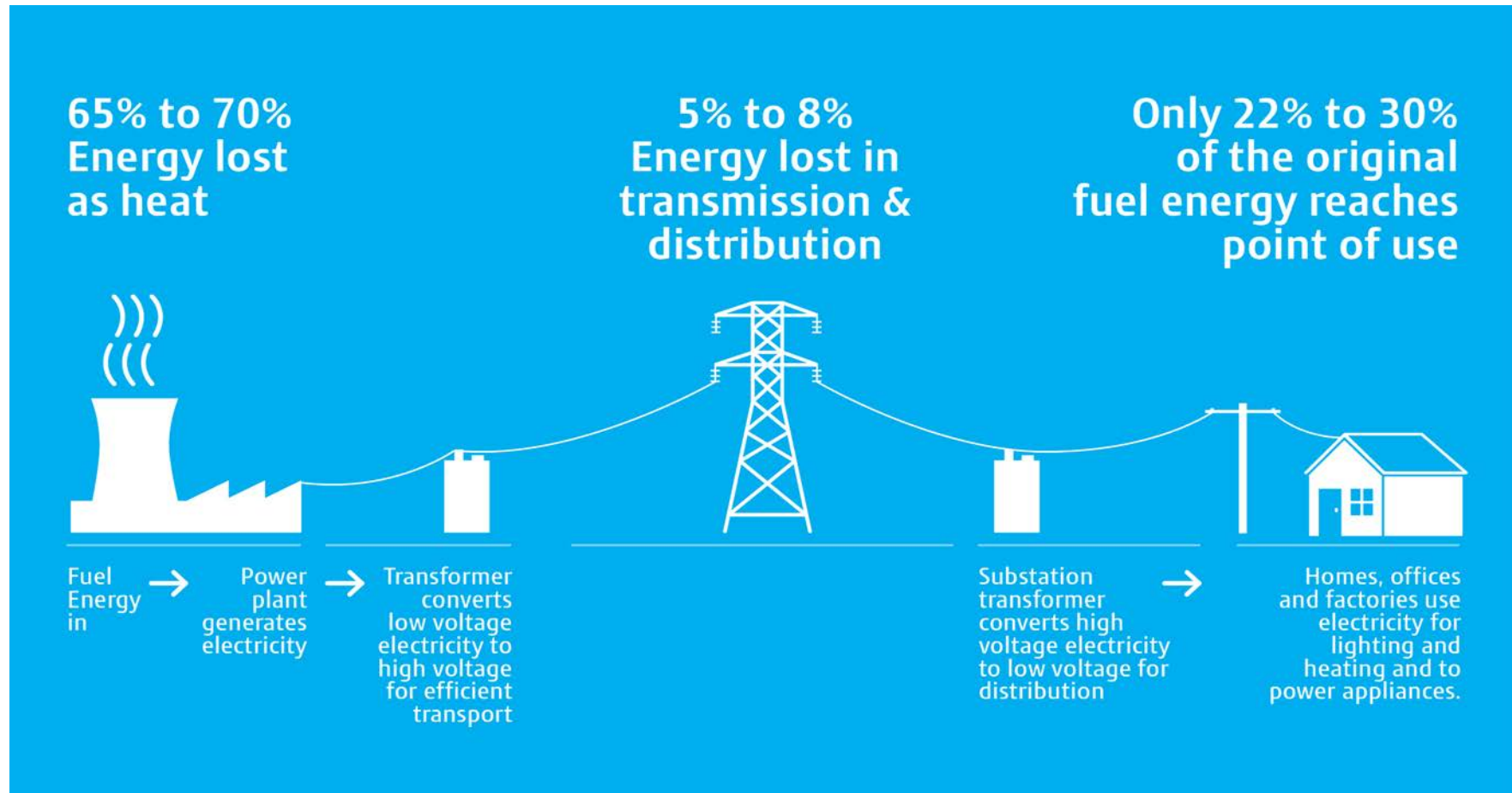
## **Solid Oxide Fuel cell technology for base load power generation**

- Our technology converts natural gas into electricity and heat
- BlueGEN delivers clean, controllable electricity on-site 24/7
- All Intellectual Property is wholly owned

## **World's highest electrical efficiency - up to 85% efficiency**

- BlueGEN generates electricity at up to 60% electrical efficiency
- Total efficiency increases to 85% with heat capture - hot water or central heating
- Closest competitor ~ 45% electrical efficiency
- More power from less fuel = energy cost savings + CO2 savings

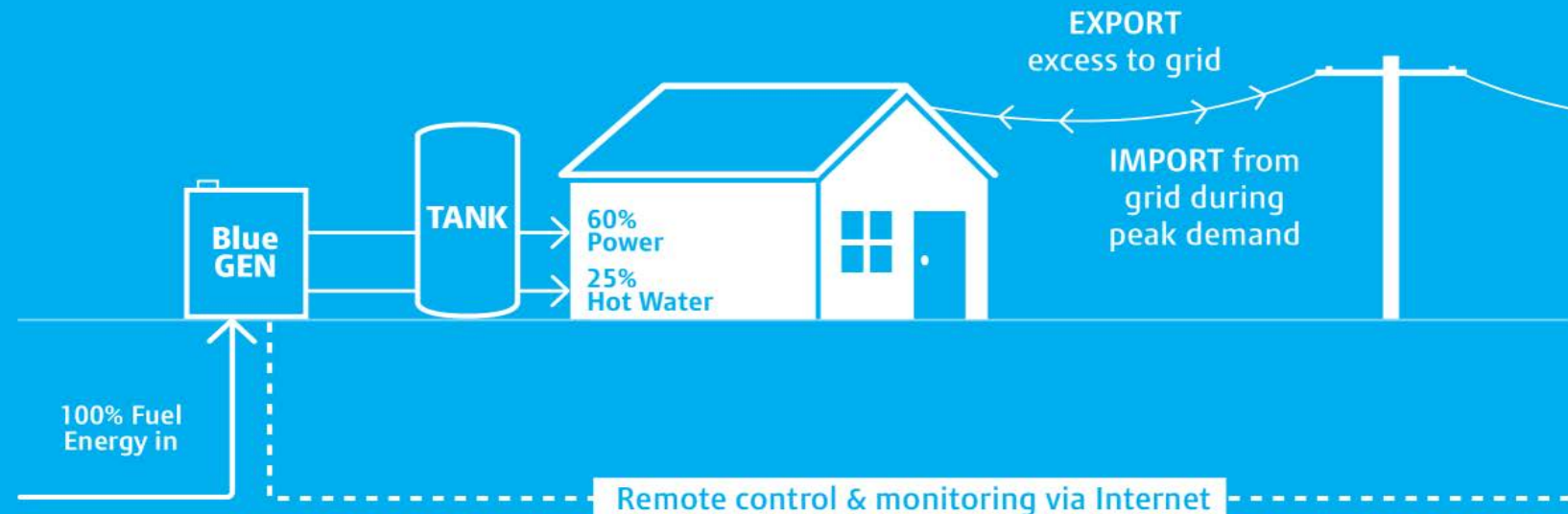
# Centralised Generation...



# Distributed Generation...

## Fuel Cell Power & Heat

Up to 85% of the original fuel energy is used in the home



# BlueGEN – The Highly Efficient Electricity Generator



- Distributed power production @ 60% efficiency
- Waste heat for hot water production 200 ltr/day
- Total efficiency up to 85%

# What is BlueGEN?

**Converts natural gas into electricity and heat via an electrochemical process**

## **The world's most efficient small-scale electricity generator**

- Generates power 24/7, all year round
- Makes 13,000 kWh per year
  - 2 x the demand of the average Australian home
- Power used on-site & exported back to grid
- In Victoria saves up to 14.5 tonnes of CO<sub>2</sub> / year

## **Easy to install & virtually silent**

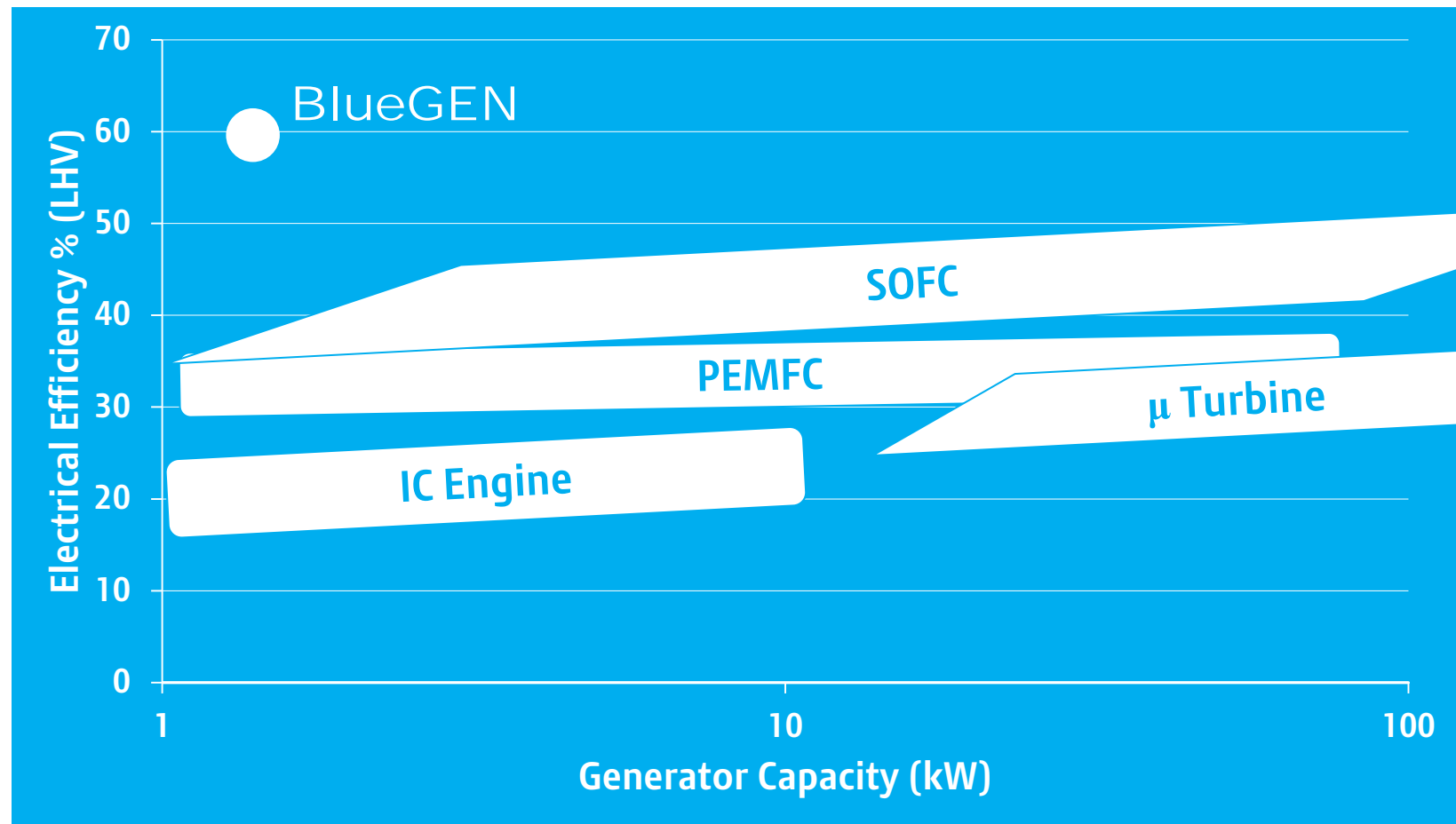
- Uses existing gas, power and water connections
- Remotely monitored and controlled over the internet







# Highest Efficiency small scale generator



# Historical Challenge Energy Industry

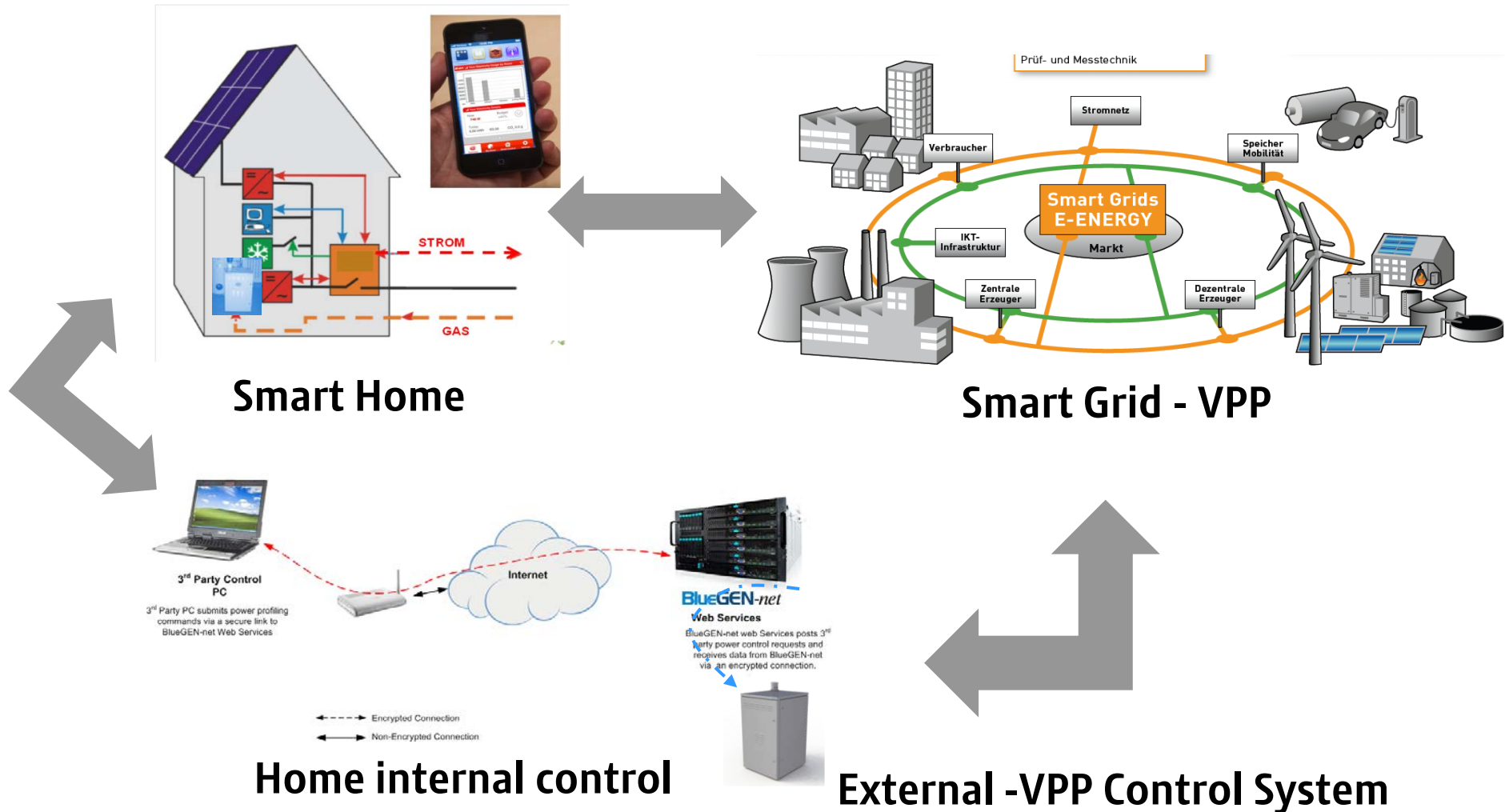
Large, centralized,  
isolated



Small, decentralized,  
connected



# Smart Grids and Virtual Power Stations – The Future



## Product Development

### Transition from R&D to Commercial Products



**CHP-2 and NetGen**



**BlueGEN**

**2004**

First residential CHP prototype

**2007**

Upgrade of pilot manufacturing facility in Noble Park

High-efficiency Gennex fuel cell module launched

Start of long-term partnership with EWE in Germany

**2009/10**

Achievement of 60% electrical efficiency

BlueGEN product concept launched

CE approval for BlueGEN product

**2013**

BlueGEN sales partners in Germany, Netherlands

BlueGEN manufacturing plant in Germany fully commissioned

Multiple industry awards in Germany, UK, Australia

**2014**

Major product improvement announced with voltage degradation reduced by 70% improving stack life to 5 years

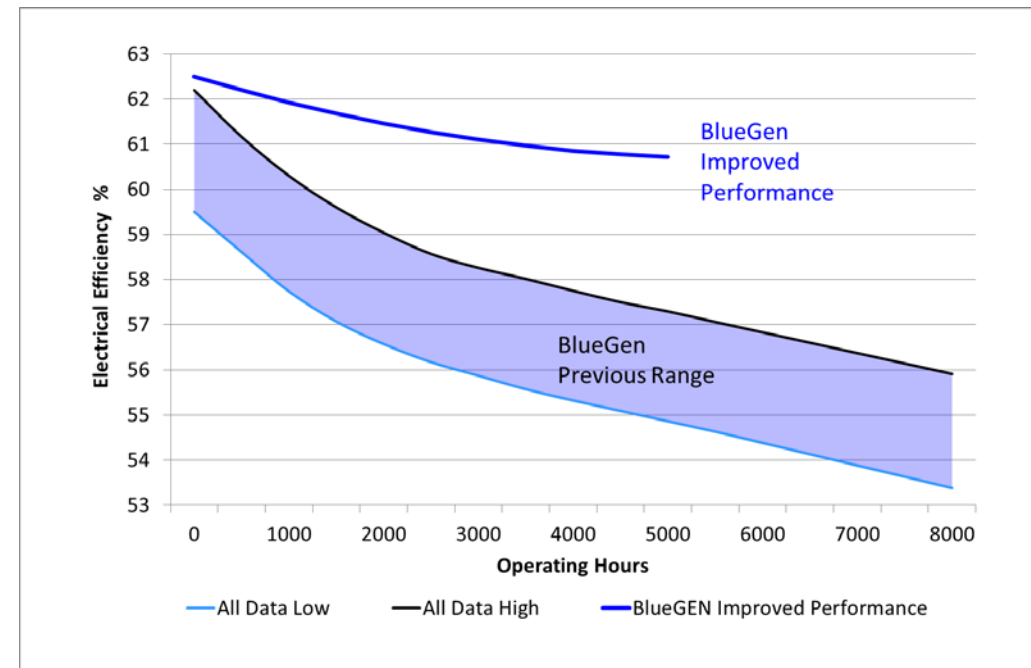
29% standard cost reduction since June 2012 at low volumes

## CFC Innovation Capability

- Core development with international recognition in Melbourne
- Extensive R&D and product development facilities
  - For components and complete systems
  - Prototyping capabilities (Cell to System Fabrication)
- Experienced development team
  - From “powders to systems” – Technology and product development
  - Manufacturing process development
- Intellectual property
  - 30 patent families in most major potential markets covering key technologies – from materials to system technology
  - Extensive “secret” know-how

# Stack Degradation Rates Reduced by 70%

- Patented improvement reduces degradation substantially.
- In-house and in-field testing by customer verifies results.
- Life of product substantially increased
- Envisaged reduction in future warranty provision.
- Introduction to supply chain in Q3 CY2014





## Productivity Improvements: Stack Assembly

- Stack sintering productivity transformed from single to multi-stack process
- Fully validated process with production yields > 99%
- Current capacity: about 1,700 stacks per year
- Planning phase for next up-scale completed (5,000 per year)



Single stack furnaces



16-stack furnace

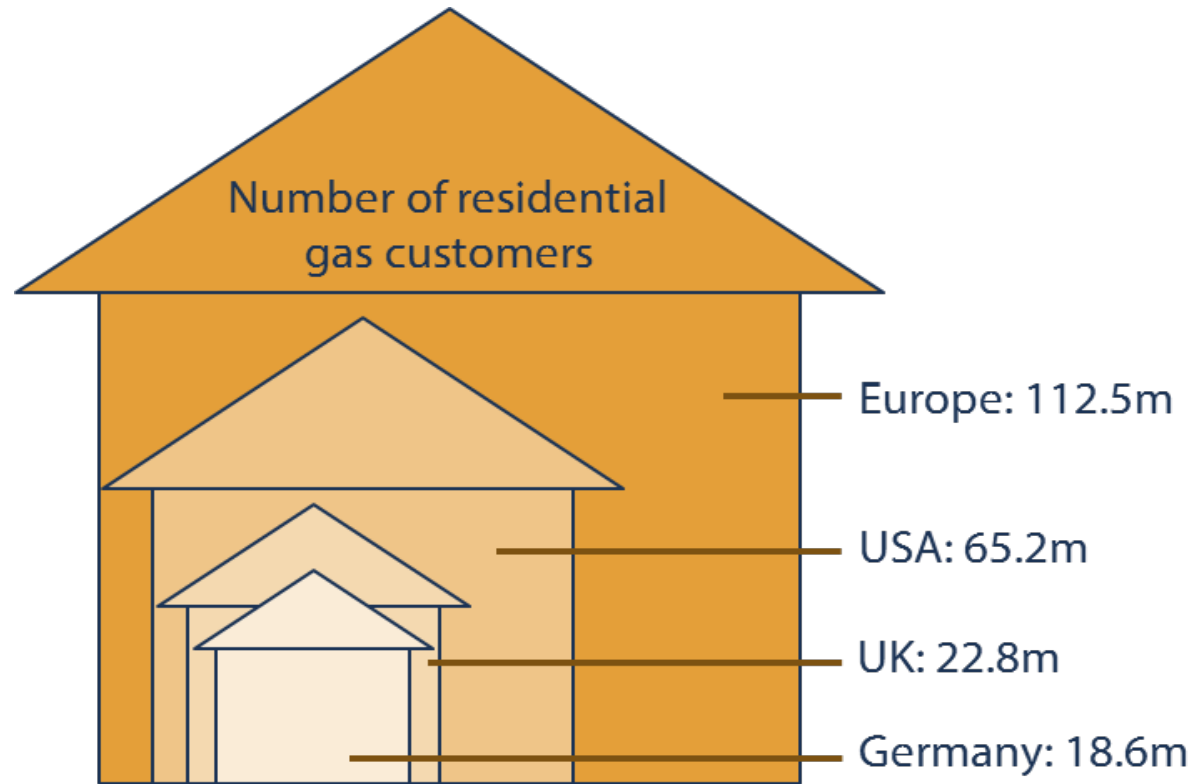


## Cost Reduction Strategy

**Clear cost reduction plan to levels that eliminate reliance on subsidies:**

- Cost down roadmap to reduce costs by >50% over time
- Reduction of 29% since June 2012
- Volume orders
- Cost effective / high quality component sourcing
- Value-engineering
- Process improvements
- Outsourcing program
- Becomes attractive in other markets (e.g. Asia)
- Second sourcing

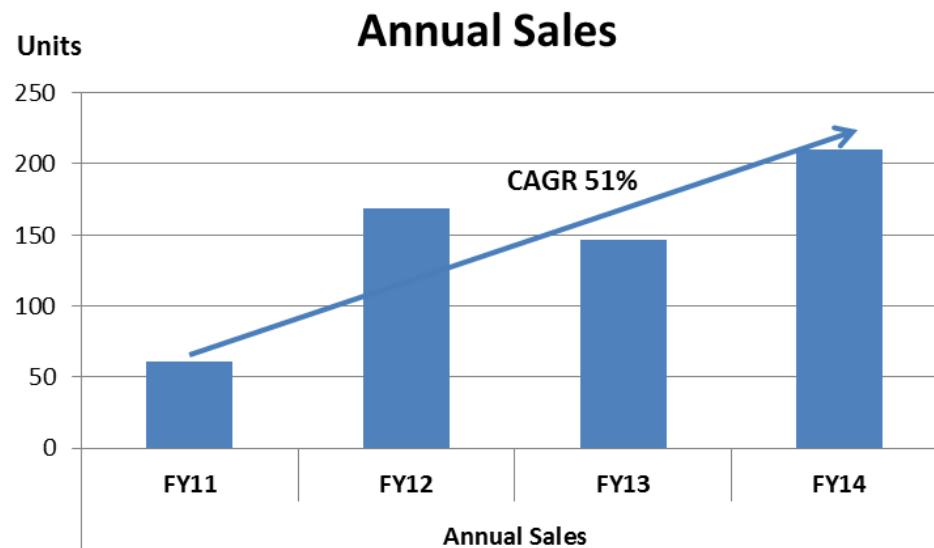
## Market potential: Overview Europe & USA



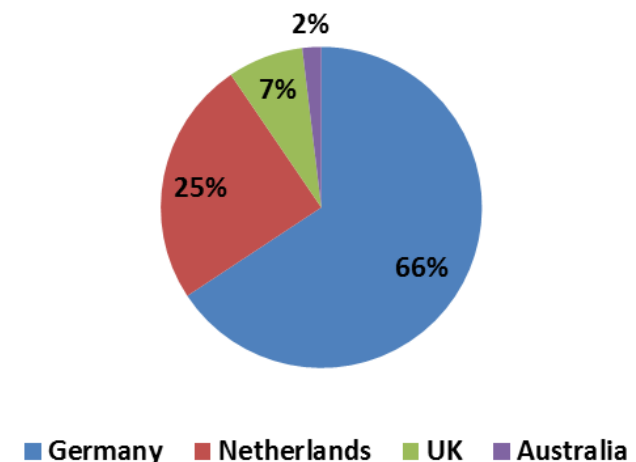
- Every household connected to gas grid is part of the market potential
- German and UK of CFC have a combined market potential of 40 million customers
- US market is large future opportunity once cost down strategy has been executed

## Sales and Marketing

- Deployed > 475 units in 11 countries with over 4.8 million operating hours
- Potential demonstrated in Germany, the Netherlands and UK markets
- Incentives available in 5 German states
- Feed-in tariff available in the UK
- Concentrating resources on selling through distribution partners and installers
  - 84 partners established in Germany
- Focussing on large scale project sales



**Sales by Geographic Region**



# Financial Summary

	2013/14	2012/13
Units Sold	210	147
Sales Revenue	\$6.1m	\$4.3m
Cost of Sales, service & warranty	\$8.4m	\$7.9m
Operating Costs	\$22.6m	\$21.3m
Finance costs and impairments	\$1.1m	\$0.9m
Loss before tax	\$24.5m	\$25.0m
Loss after tax	\$21.4m	\$19.8m

- Unit sales and revenue increased by 43%.
- Cost of Sales per Unit decreased by 29% since 2012
- Operating costs increase due to ramp up of sales and marketing resources in early FY13.  
These costs have been reduced since March 2014.

# Global demand for CFC Technology

## Industry Sources predict Significant Residential Volume Growth in Asia and Europe:

- Residential fuel cells installed in Japan are forecast to increase from 40,000 in 2012 to 1.4 million units by 2020 (ENE-FARM Partners).
- Industry surveys estimate market growth for fuel cells in Germany alone of >90% p.a. from 1,700 units in 2013 to 210,000 units in 2020 (VDMA 2013).

## Discussions Underway

- With North American and Asian companies re larger and smaller units.
- For different applications.
- For potential distribution partnerships in North America, Europe & Asia.
- For potential manufacturing alliances in Europe and Asia.
- Stack supply for Asia.
- For potential manufacturing for third party mCHP unit in Heinsberg facility.

# BlueGEN Sales Pipeline

## UK

- Large scale multi-unit projects primarily in social housing sector

## Germany

- Concentrating on indirect sales – installers and distributors.
- Potential sales: Avilos – 98 units.  
Approval for 100 unit sale pending

## Austria

- Concentrating on distributors
- Potential 50+ units

## Benelux

- Major project under negotiation

## Highlights

- Proven Fuel cell performance, global technology leader
- Leading manufacturer, 4.8 million hours performance validation
- Industry leading efficiency: 60% electrical to 85% overall
- Major recent technical improvement – expected stack life increased to 5 years
- Manufacturing costs reduced by 29% per unit since 2012
- Sales strategy re-positioned to lower sales cost per unit
- 43% sales increase in 2014 with 210 units sold
- European Industry growth estimates exceed 90% p.a. (Germany)
- Strong potential sales pipeline