



*CERAMIC FUEL CELLS*

# Clean Power for Global Markets

Shareholder Update  
12 July 2012

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# Current Status

- Strong Revenue and Sales growth
  - FY12 revenue of ~AUD 6.5m, increase of 75% from FY11
  - Order book doubled from June 2011
- Sales outlook is strong, particularly in Germany
  - Revenue has grown strongly but needs to increase faster to fund operating costs. Pursuing several options to raise additional working capital
- Our technology has a clear competitive advantage
  - Highest electrical efficiency creates more value for customers
- Our technology is proven
  - More than 1 million hours' operation across 9 countries
- German manufacturing plant built and operating
- Strong policy support in key markets (Germany, UK)



# Commercialising

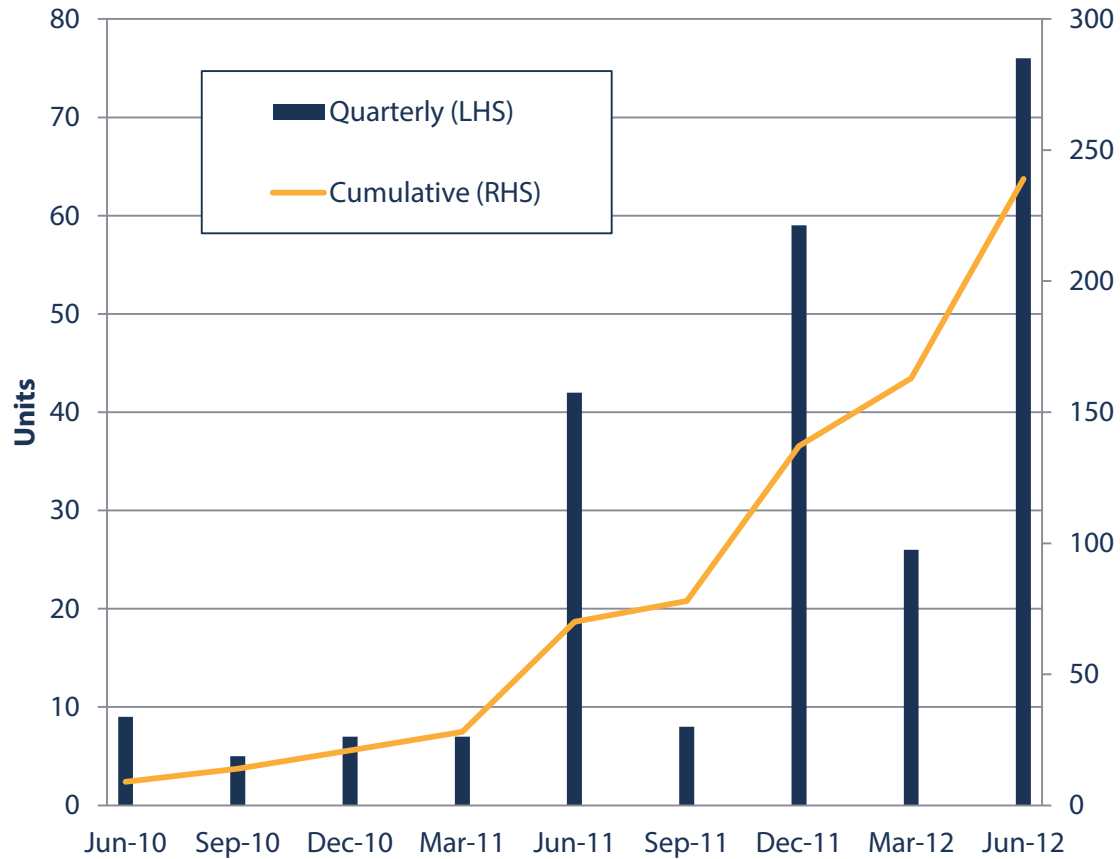
- CFCL has commercialised its technology into products and is selling to customers and through local distributors
- At 6 July the Company has received orders for 639 products
  - 375 BlueGens plus 264 integrated mCHP units
  - 213 products are installed at customer sites, across 9 countries
- Order book 108% increase from 30 June 2011
- Current focus on delivering products to convert these orders into revenue and cashflow
  - During the June quarter we booked to revenue sales of 76 units, bringing the total sales for FY12 to 169 units
  - 213 products are installed at customer sites, across nine countries



# Increasing Sales

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## Unit Sales



# Future Value

## Large global markets for future products

- Now: focused strategy to get cashflow positive as soon as possible
  - Single technology, focused product strategy in key markets
  - Focus is necessary and appropriate given current resources & funds invested
- Later: many opportunities to generate value, either in-house or with new development partners:
  - Expanding more quickly in existing markets, e.g. USA
  - Developing products for new markets, e.g. China, India, Brazil
  - Developing products for new fuels, e.g. LPG, biogas
  - Developing new applications, e.g. off-grid power, electric vehicle charging stations, on-site generation plus battery storage, larger power output units
- There is a large global market for the Company's world leading clean energy technology





*CERAMIC FUEL CELLS*

# Introduction

World-leading clean  
energy technology

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# About us

## Ceramic Fuel Cells Limited (CFCL)

- Formed in 1992
  - From the Australian Government research institute (CSIRO)
  - Employs approx. 140 staff world-wide
- Head office in Melbourne, Australia
  - Ceramic powder plant in United Kingdom
  - Volume manufacturing plant in Germany
  - Regional sales office in The Netherlands
- Listed on ASX and London AIM [code: CFU]





# What we do

## **Fuel cell technology for stationary power generation**

- We make products that deliver clean, controllable electricity on-site
- Our solid oxide fuel cell technology converts natural gas into electricity and heat, without combustion or noise
  - All Intellectual Property (IP) is wholly owned

## **Generate power on-site with the world's highest electrical efficiency**

- We generate electricity at up to 60% efficiency
- More power from less fuel = Energy cost savings + CO2 savings
- Generate power close to where it is used
  - For homes, businesses and other buildings

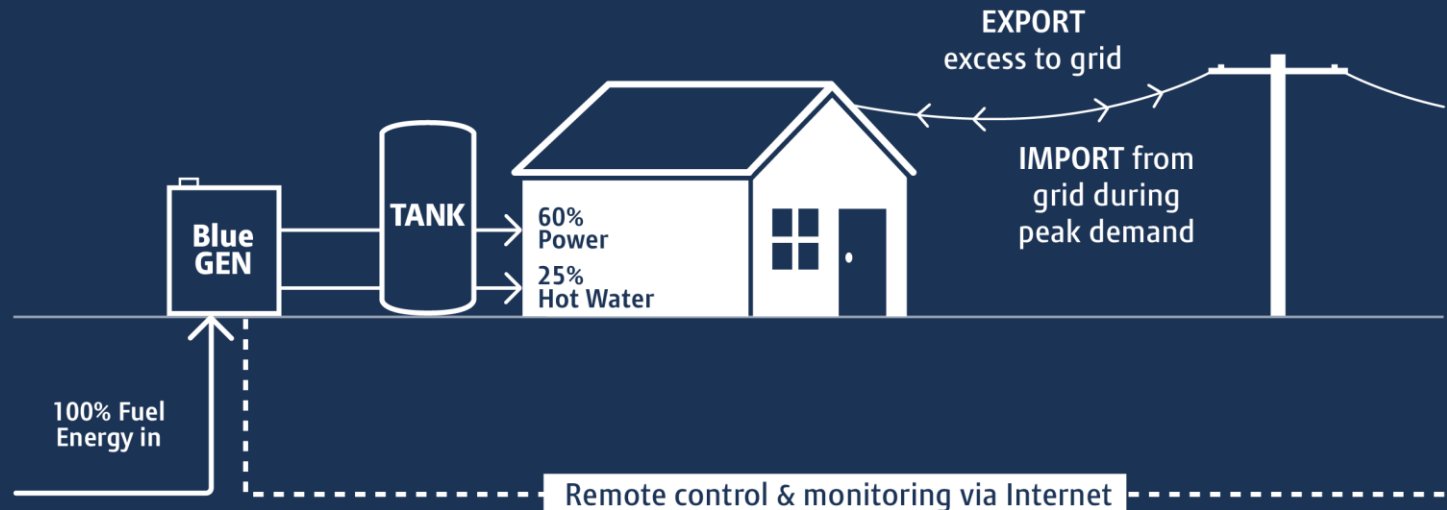


# Distributed Generation

Generating power close to where it is used

## Fuel Cell Power & Heat

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

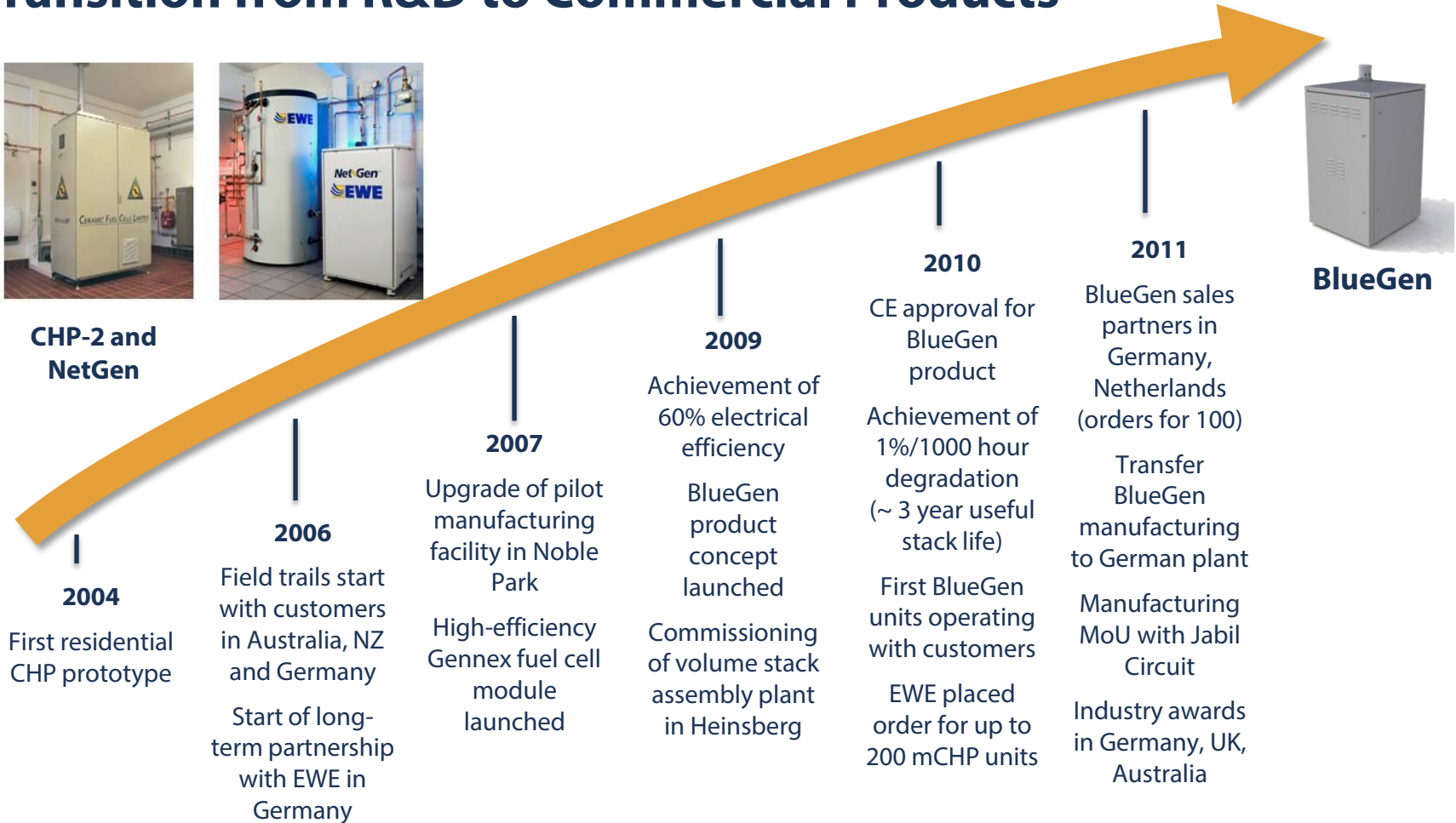


# Product Development

## Transition from R&D to Commercial Products



**CHP-2 and NetGen**

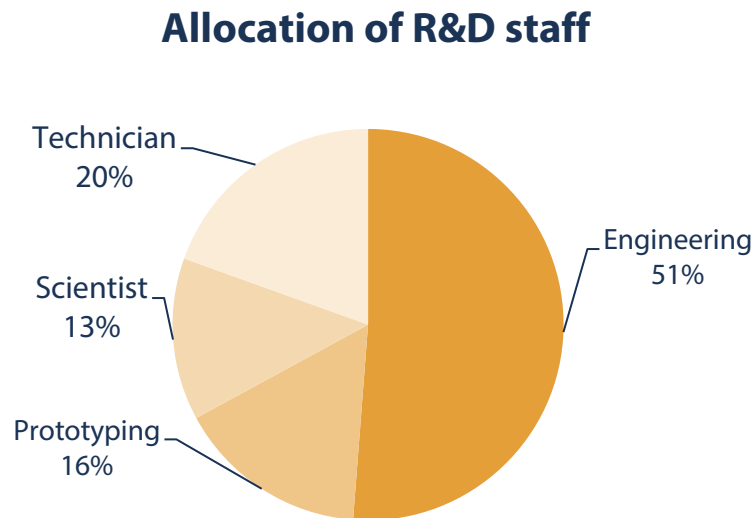


**BlueGen**



# Research & Development

- Highly experienced world recognised R&D team
- Responsible for designing and developing fuel cell materials, cells, stacks, balance of plant components, system integration and manufacturing engineering
- Strategic outsourcing



## **Current R&D focus:**

- *Extend product lifetime & robustness*
- *Reduce costs through value engineering and design changes*
- *Improve performance through new designs, processes and materials*

# Intellectual Property (IP)

- CFCL has full end-to-end IP
  - Powder, cells, stacks, balance of plant, systems, control software
- Unique know how, all developed in-house: e.g. ceramic substrate, reforming, burner system, thermal management, control software
- Existing IP grants a competitive advantage over potential competitors
- IP is protected by a portfolio of patent families in core markets
  - See Appendix for list of patents



CERAMIC FUEL CELLS

## Our Products

Clean on-site power and heat...

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# Our products

## On-site power for residential & small commercial buildings

- > 1-2 kW power, 24\*7\*365
  - ~13,000 kWh power per year
  - Plus 200 litres hot water per day
- > Highest electrical efficiency
- > No noise or vibrations
- > Power can be turned up and down remotely
- > Flexible installation options create a large addressable market



### BlueGen

- > Micro generation unit
- > Continuous power plus hot water
- > Connects to existing heating and hot water systems
- > Made by CFCL



### Integrated mCHP

- > Fuel cell plus boiler
- > Makes power, hot water and space heating
- > Replaces old heating systems
- > Made by appliance partners

# International awards



Microgeneration UK 2011



Die Landesregierung  
Nordrhein-Westfalen



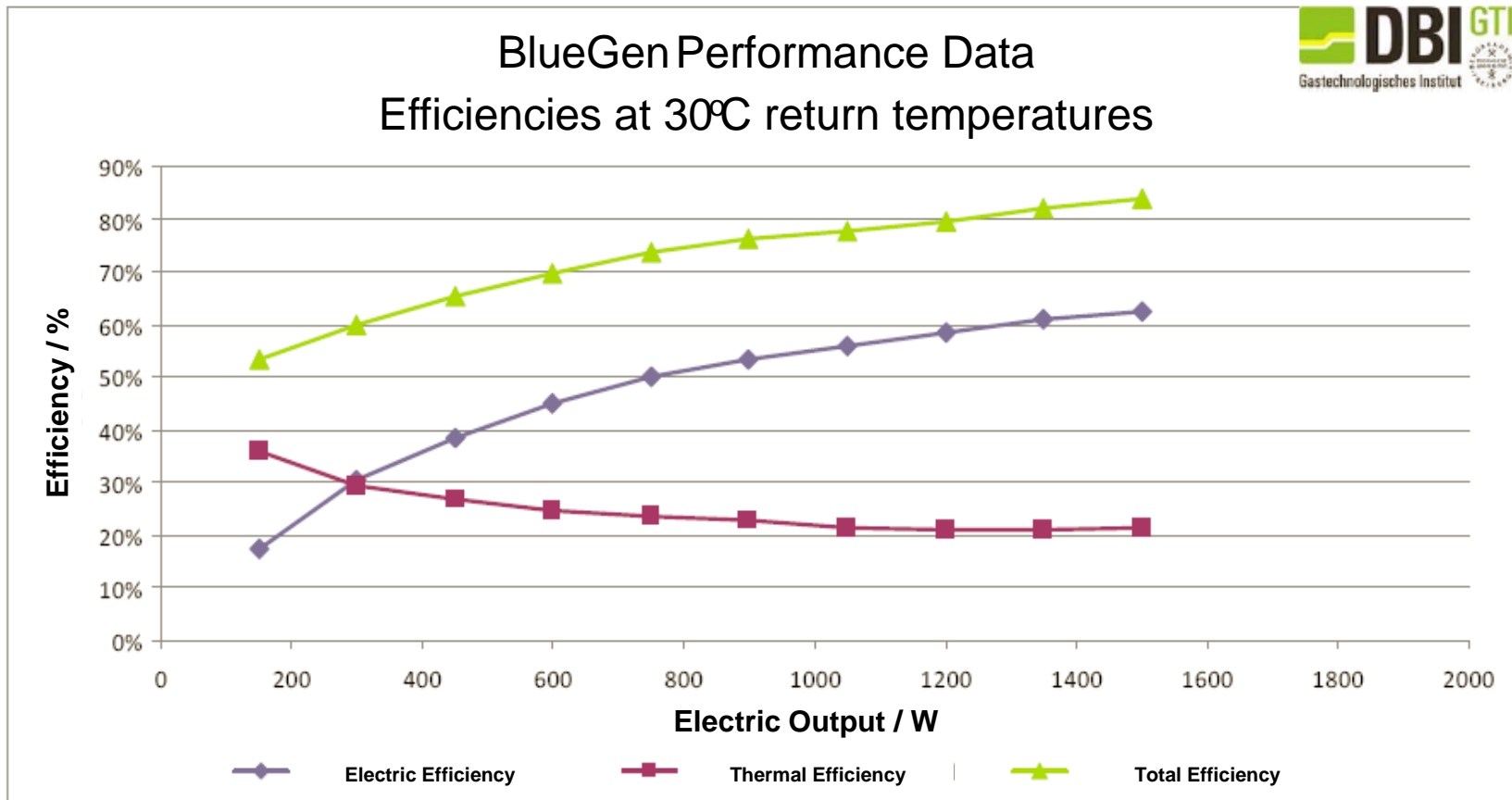
*The miracles of science™*



# Independent Testing

## Electrical Efficiency confirmed by DBI in Germany

(Gas Technologies Institute)



# Advantages over other mCHP

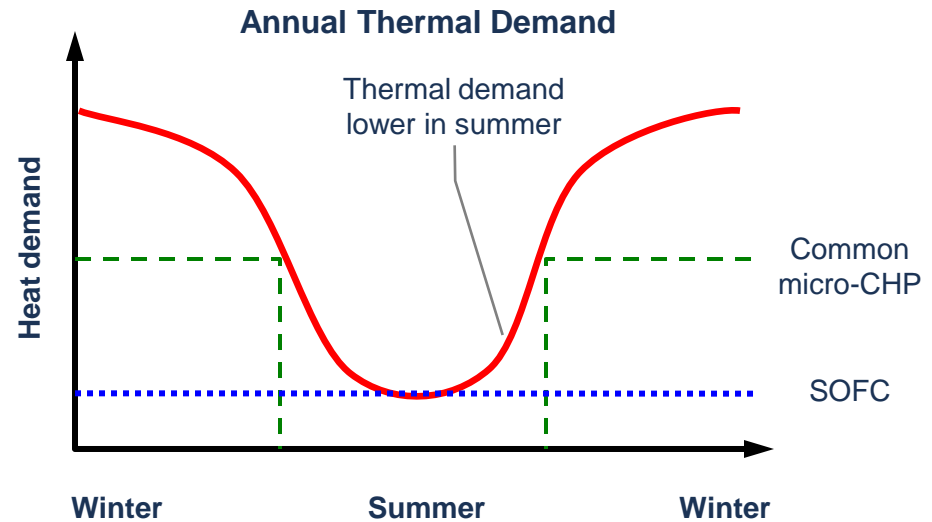
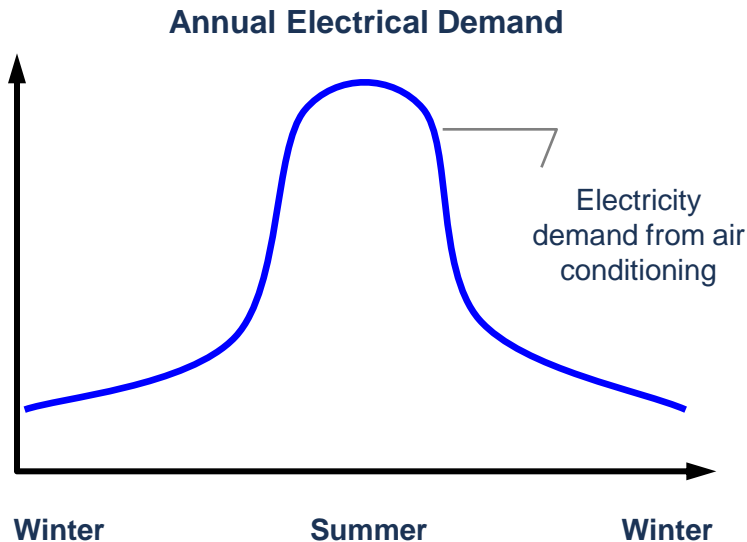
- Highest electrical efficiency
  - Lowest marginal cost of generation
- Low heat output
  - No excess heat: product can operate 24\*7, all year round
- Controllable
  - Turn power up or down, while retaining high efficiency
- No noise or vibration
  - Can be installed inside or outside



# Power When You Need it

## Understanding electricity and thermal demands...

- > Heat and power demands do not overlap
- > Other mCHP technologies produce a *lot* of heat



- > High-electrical efficiency from SOFC allows all year operation

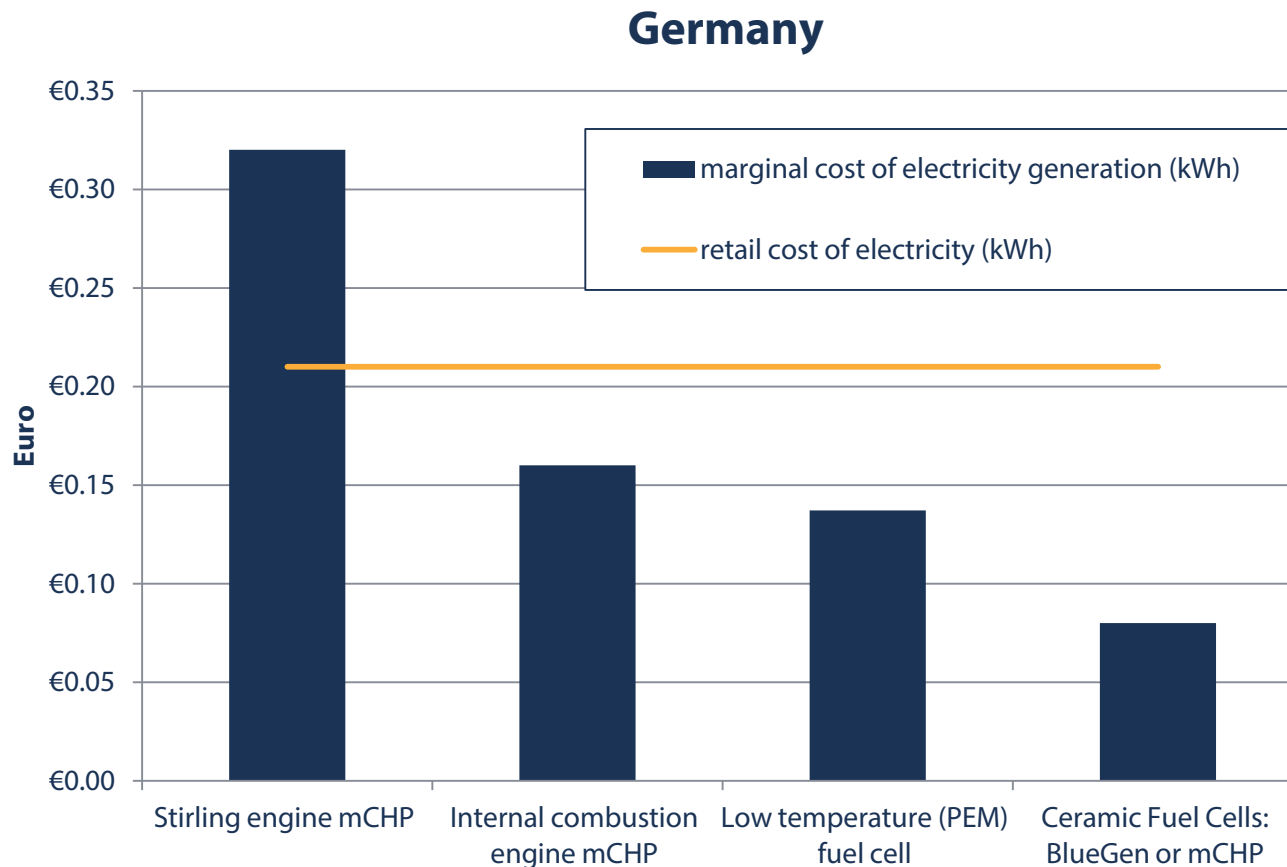
# Peer Comparison

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	Classical mCHP		Solid Oxide Fuel Cells				
	Internal combustion engine	Stirling engine	Peer A	Peer B	Peer C	Peer D	CFCL
<b>Electricity output/unit</b>			> 0.8 kW	1.0 kW	100-200 kW	1 kW	1.0-2.0 kW
<b>Heat/Power</b>	1.6 – 3.5	2.8 – 8.3	2.0	2.5	n/a	n/a	0.4
<b>Total efficiency</b>	up to 90%	up to 90%	87%	95%	n/a	>85%	>85%
<b>Peak electrical efficiency</b>	< 30%	15%	30-40%	30%	50%	45%	60%
<b>Part load capability</b>	**	*	****	****	****	****	*****
<b>Operation character</b>	start-stop	start-stop	start-stop	start-stop	continuous	continuous	continuous
<b>Development status</b>	Commercial	Commercial	Development	Field tests	Commercial	Development	Commercial

# Low Cost Power Generation

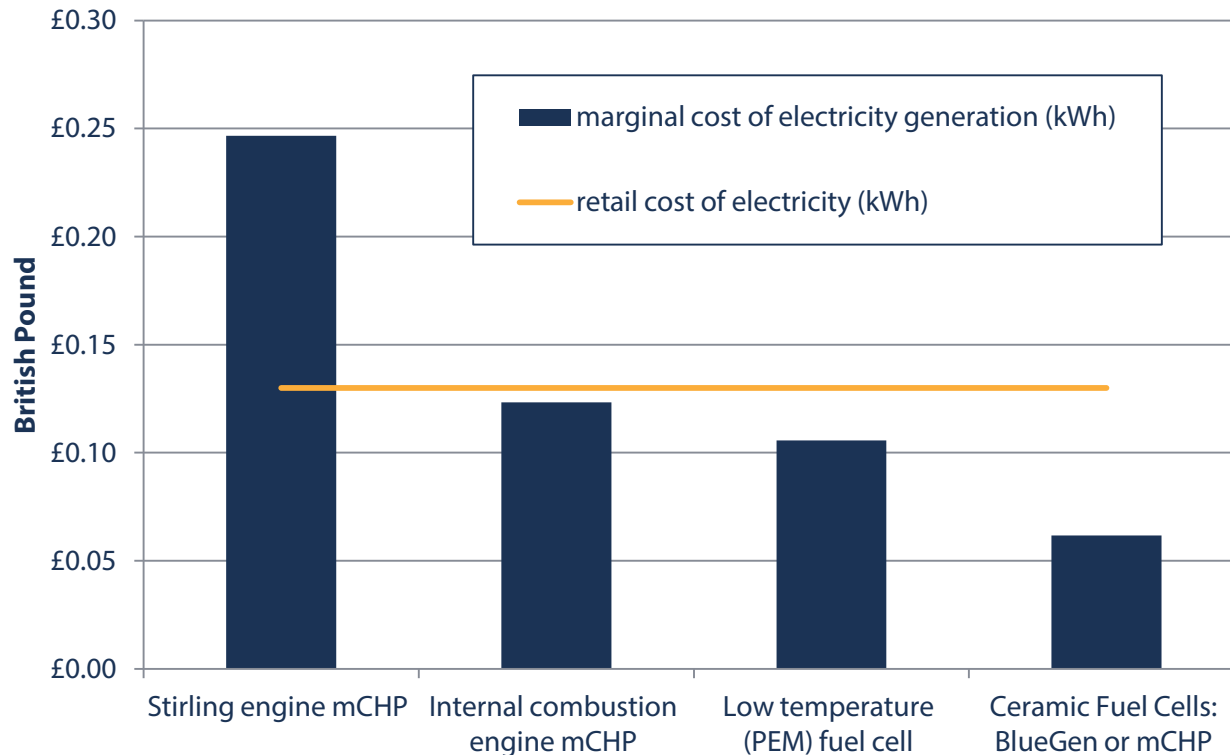
High electrical efficiency = low marginal cost of generation



# Low Cost Power Generation

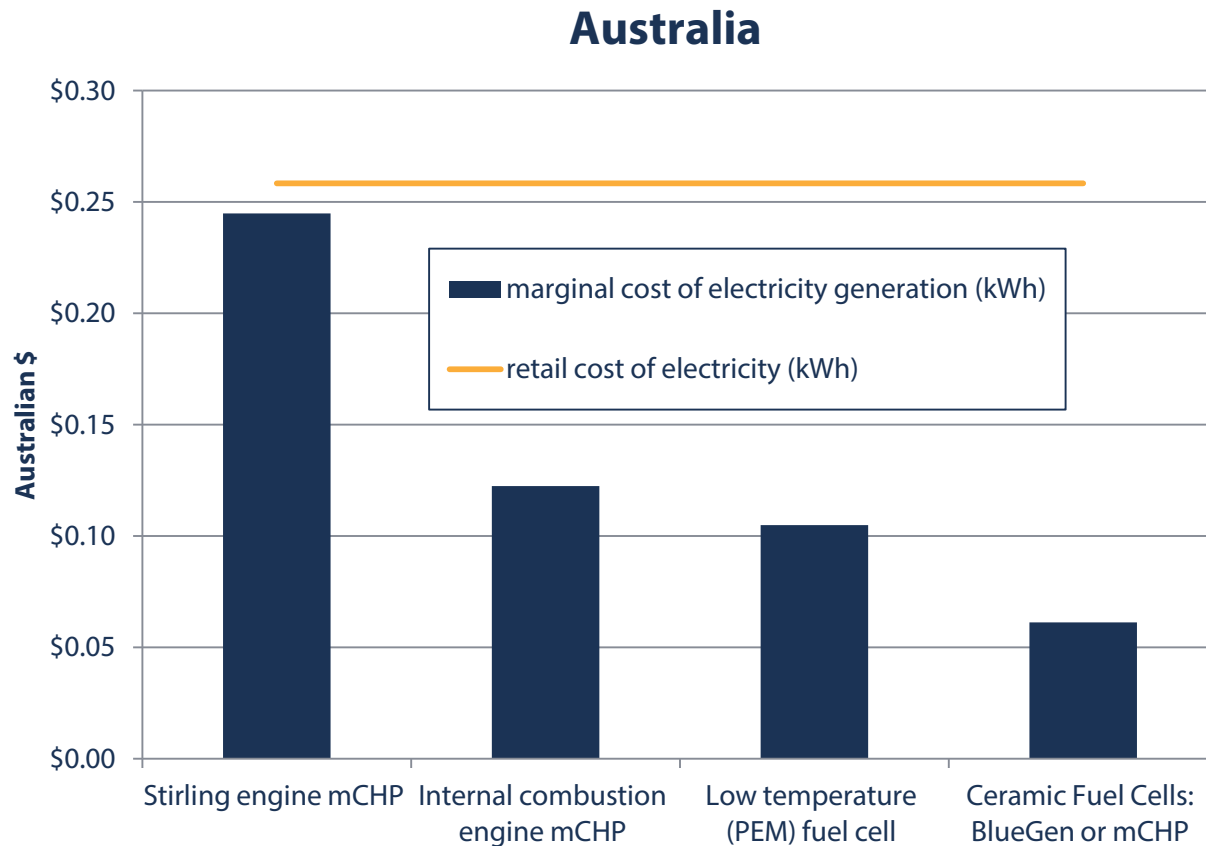
High electrical efficiency = low marginal cost of generation

## United Kingdom



# Low Cost Power Generation

High electrical efficiency = low marginal cost of generation



# Virtual Power Plants (VPP)

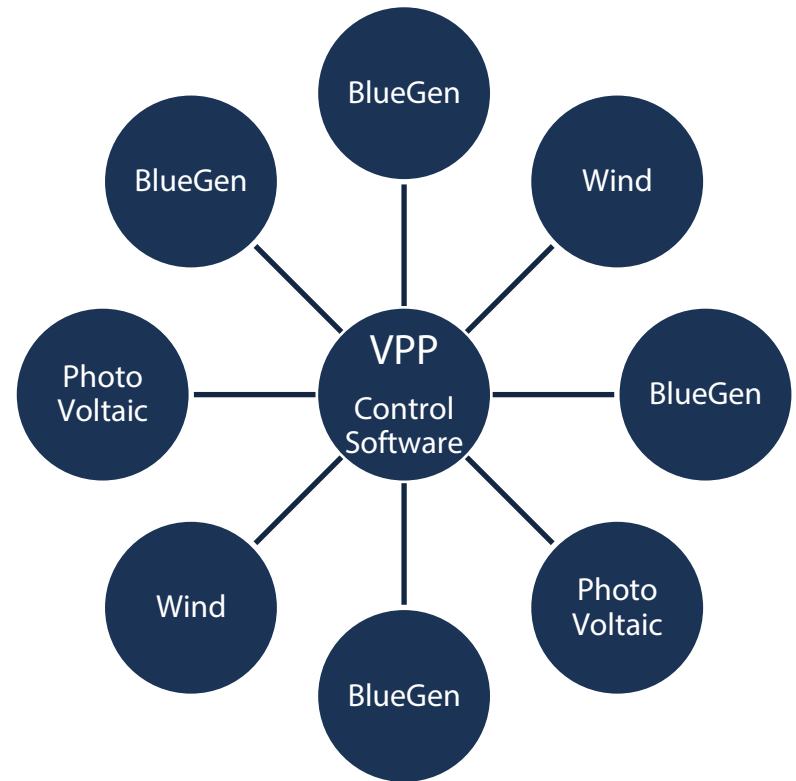
## Controllable distributed generation enables VPPs

### > "Internet of Energy"

- Cluster of distributed electricity generation units, centrally controlled and operated
- Output is modulated up or down to meet peak loads and balance intermittent power from wind or solar

### > BlueGen units are being operated as part of VPP projects

- Germany: *RegModHarz* project – Siemens control software
- Netherlands: BlueGeneration, Liander - IBM control software





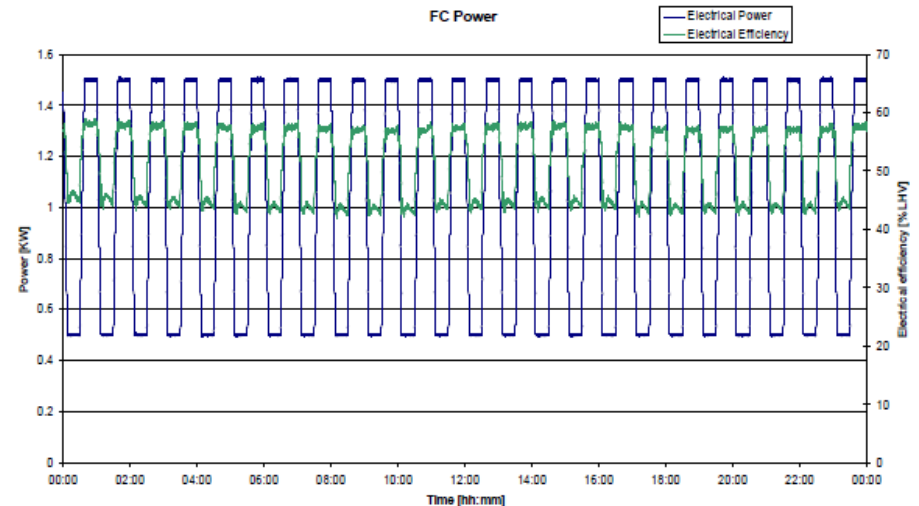
# Power Modulation

## KIWA Gastec test report

- 3 BlueGen units modulated every 30 minutes, over 24 hours
  - BG 14: 500W to 1500W – takes 7.5 minutes
  - BG 16: 500W to 1750W – takes 9.4 minutes
  - BG 15: 500W to 2000W – takes 11 minutes
- Electrical efficiency still very high, even with modulation:
  - ~57% at high power level
  - ~44% at low power level
- First two months' results show no stack degradation



BlueGen units at KIWA Gastec, Netherlands



# Customer Value

## Creating different value for different customers

➤ Who owns and controls the unit affects the benefits they get

Value	Household Owner	Retail Utility	VPP
Low marginal cost of generation	✓	✓	✓
Lower carbon emissions	?	✓	✓
Network efficiencies & savings	X	X	?
'Free' heat for hot water	✓	X	X
Export power for peak price or demand	X	?	✓
Bundled services to reduce customer churn	X	✓	✓
Tax deductions for ongoing costs	X	✓	✓





# Global Markets for Clean Energy

Focus on Key Markets

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# Key market strategy

## Our 'go wide' and 'go deep' approach:

**1<sup>st</sup>, go deep** in markets that have:

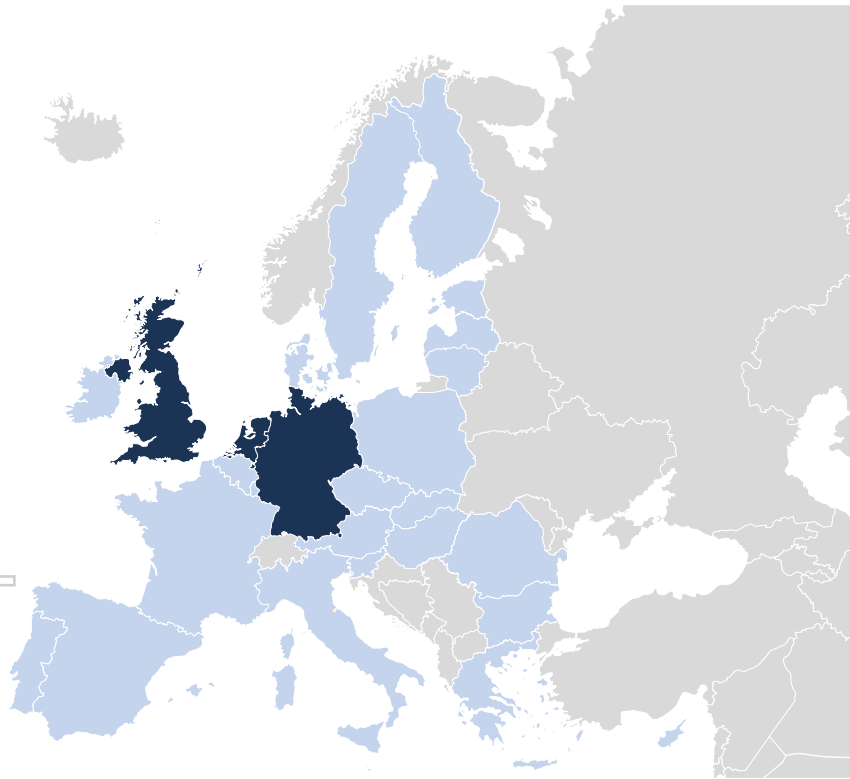
- Supportive regulatory settings
- Large volume potential
- Established infrastructure
- Ability to pay highest price

**2<sup>nd</sup>, go wide** in markets that have the potential to develop into 'deep' markets

**3<sup>rd</sup>, go large** in mass markets, once costs have come down:  
China, Brazil, Russia, India...

# Supportive Energy Policies

## Energy targets of key European markets by 2020



### European Union

- 20% reduction of CO2 emissions
- 20% increase of energy efficiency
- 20% share of renewable energy

### Germany

- 20% reduction of CO2 emissions
- 20% increase of energy efficiency
- 20% share of renewable energy
- 25% power generation from CHP

### The Netherlands

- 16% reduction in CO2 emissions
- 14% share of renewable energy

### United Kingdom

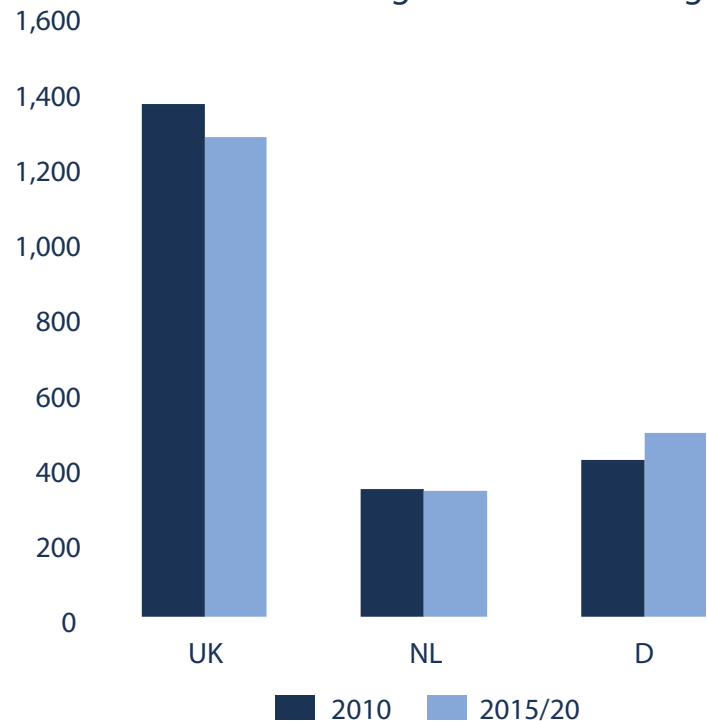
- 50% reduction of CO2 emissions
- All new homes low carbon from 2013
- 15% share of renewable energy

# Large market potential

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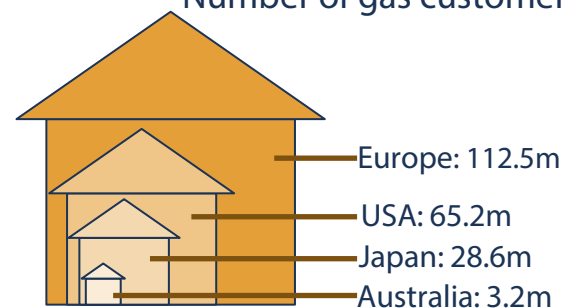
## Integrated mCHP

Annual sales of wall-hung and floor standing boilers



## BlueGen

Number of gas customers



- > BlueGen fits with existing heating systems, so is not limited to the boiler replacement market
- > For example: existing gas heating systems in Germany:
  - 4 to 11kWth: 1.2m
  - 11 to 25kWth: 6.1m
  - > 25kWth: 1.7m
- > If a BlueGen were added to all of the 6m heating systems <25kWth, this would deliver power of approx. 72 TWh (6 million units x 1.5kW x 8,000 hrs/year)

Source: Delta Energy & Environment



# Commercialising

Increasing Sales in  
Launch Markets...



# Sales strategy

## Our 'top-down' and 'bottom-up' approach:

1. Sell to early customers to 'seed' the market
2. Sell to distributors to build volumes

**'Top Down' sales channel**  
via utilities & others

**The market**

via distributors (+ direct sales)  
**'Bottom Up' sales channel**



# Customer Value Model

## Simplified Customer Value Model in UK and Germany

	<b>UK</b>	<b>Germany</b>
Power generated (kWh)	13,000	13,000
Marginal cost of generation (per kWh)	6 pence	8 Euro cents
Power saving against retail cost	910 GBP	1,365 EUR
Feed in tariff payment	1,625 GBP	1,200 EUR
Heat saving (vs electric hot water heating)	680 GBP	1,100 EUR
Energy tax exemption (in Germany)		119 EUR
Gross benefit	3,215 GBP	3,784 EUR
Less maintenance cost	(900 GBP)	(950 EUR)
<b>First year net benefit</b>	<b>2,315 GBP</b>	<b>2,834 EUR</b>

*Note: this uses the proposed increased feed in tariffs of 5.4 cents in Germany and 12.5 pence in the UK. The German 'feed in tariff' amount of EUR 1,200 comprises the CHP Bonus (EUR 704) plus the wholesale price (EUR 294) plus avoided grid fees (EUR 202). For simplicity these examples do not include capital costs or tax and assume the BlueGen operates at 1.5 kW constantly at maximum efficiency. Savings will be lower if replacing gas hot water. The actual savings will also vary based on how the unit is operated.*



# Germany

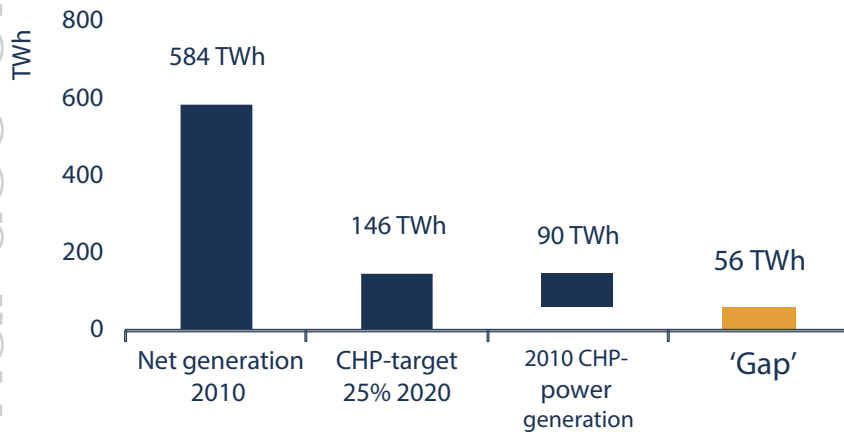
## Retail Energy Market is dominated by Stadtwerke

- Stadtwerke (“city works”) have ~85% of retail energy customers
  - Provide bundled services: gas, power, water, waste, internet
  - Typically own the local gas & power networks, but buy power from the big generators
- There are more than 800 Stadtwerke in Germany
  - Usually owned by local Councils
  - They work together through co-ops or buying groups (e.g. Trianel, Thuga)
- Our products provide many benefits for Stadtwerke
- Some now offering BlueGen to customers with a subsidy: e.g. SW Aalen
- In June sanevo sold 23 BlueGen units to Trianel, to be deployed with 17 Stadtwerke throughout Germany



# Germany – CHP

## Federal CHP-targets



### CHP Law:

- 25% of power generation by 2020
- In 2010, CHP was ~ 15% = 'gap' of ~56 TWh
- Decreasing heat demand means limited growth potential of large CHP, large potential for smaller mCHP-appliances
- For example: if half of the 56 TWh 'gap' comes from mCHP (1.5kW), this equals 2.3 m units

## Supporting schemes

### Feed in tariff

- CHP "bonus" feed in tariff, increased in June 2012 to 5.4 Euro cents / kWh, on top of the wholesale price

### Federal Subsidy

- 1,650 Euros per BlueGen, from April 2012
- BlueGen is the only fuel cell mCHP eligible

### State Government Schemes

- NRW: announced 250 Mil. Euros funding for CHP. Details expected in next few months.
- Saxony: 1000 unit "basement program" (1000 Keller Programm)
- Saarland: Subsidy of 30% of BlueGen costs
- Hesse: Subsidy for 30 BlueGens
- Considerations ongoing in Baden-Wuerttemberg

# Germany - Market Launch



## > Building sales

- Investment in sales force and marketing
- Displaying BlueGen at more than 40 local trade fairs in 2012
- First sales to Stadtwerke and commercial customers

## > 30 BlueGen units delivered to sanevo so far

- Plan to deliver the rest of the first 100 unit order over next 4 months, then expect order for 500 units

## > Accelerating sales

- More aggressive pricing, reference customer program
- Customer offer includes a full service contract for three or 10 years

## > Sanevo value apart from sales

- Standardize BlueGen installation "kits" to reduce costs
- Help with local product accreditations / regulations
- Integration with heating systems, solar, batteries, heat pumps
- Installation and on-site services



# German customer value model

## A more detailed example of BlueGen economics

### Natural gas input:

21,681 kWh<sub>th</sub>/a

### Energy tax exemption<sup>1</sup>:

21,681 kWh x 0.55 €/kWh  
= 119€/a



### BlueGen unit

1.5 kW<sub>el</sub> / 0.6 kW<sub>th</sub>  
Full load hours: 8,672 h/a  
Electrical efficiency: 60%  
Thermal efficiency: 25%

### Power production costs

13,009 kWh x 4.8 €/kWh / 60%  
= 1,040 €/a

### Power production:

13,009 kWh<sub>el</sub>

> residential consumption: 6,500 kWh<sub>el</sub>

> grid export: 6,509 kWh<sub>el</sub>

Power cost savings

6,500 kWh x 21.00 €/kWh = 1,365 €/a

CHP-remuneration

13,009 kWh x 5.41 €/kWh = 704 €/a

Market power price

6,509 kWh x 4.51 €/kWh = 294 €/a

Avoided grid fees

13,009 kWh x 1.55 €/kWh = 202 €/a

**Total remuneration = 1,199 €/a**

**Power cost savings = 1,365 €/a**

### Heat production:

5,203 kWh<sub>th</sub>

<sup>1</sup> Granted, if total efficiency level of system is above 70 percent (BlueGen's efficiency is assumed at 85 percent with heat recovery)

# United Kingdom

## Working with E.ON, plus direct sales to targeted market segments (e.g. social housing)

- E.ON: 2011 order for 105 units under EU funded JTI program
  - 45 BlueGen units: all delivered on time, before 30 June
  - up to 60 mCHP from early 2013, developed with Ideal Boilers
- “E.ON Storage 160” mCHP units:
  - 15 BlueGen units plus boilers from Ideal
  - CE approved for field trials in homes
  - Planned to be installed in September
- Ongoing discussions to move from product development agreement to a product supply agreement with firm orders



# United Kingdom

## Policy Support for mCHP

- Feed in tariff
  - Increased from October 2012 to 15.7 pence (12.5 p/kWh generated plus 3.2 p/kWh exported)
  - BlueGen is the only fuel cell mCHP eligible for the feed in tariff
- Discounted VAT (5% not 20%)

*“Micro-CHP can play a much larger role in driving the decentralised energy revolution...there are few homes that couldn't benefit from micro-CHP... There is a clear role for Government leadership to bring micro-CHP to market...as an attractive, price-competitive alternative to taking electricity from the grid or installing a conventional boiler.”*

*Greg Barker, UK Minister of State, Feb 2012*

# UK - Low Carbon Homes

## Housing standards to drive energy efficiency

- New homes must meet Low Carbon requirements:
  - 2013: “low carbon” = 44% lower carbon than 2006
  - 2016: “zero carbon” = 70% lower carbon than 2006
- BlueGen powering a low energy home
  - New home built by Crest Nicholson in Epsom, Surrey, as part of AIMC4 program
  - BlueGen provides power, hot water and space heating for the home: no separate boiler

Video at <http://www.cfcl.com.au/webcasts/>  
Case study at <http://www.bluegen.info/crest-nicholson-total-integration/>





# Netherlands & Belgium

- CHP is well known in NL:
  - Large CHP provides 20% of power, very high gas penetration
- Key players include Gasterra
  - 50% owned by NL Government; 25% Shell; 25% Exxon
- mCHP feed in tariffs, equal to retail price:
  - NL: ~23 Euro cents, up to 5,000 kWh exported per year
  - Belgium: ~21 Euro cents, up to 10,000 kWh exported per year
- Customers generate most value from using all power on-site
- New CFCL Benelux sales manager to drive direct sales & support sales partners



# Netherlands - market launch

## BlueGeneration (formerly Zestiq)

- Direct sales resources plus sub-channel 'The energy company'
- Focus on Government and small commercial customers
- Plans for a 'bulk purchasing' model
- Eneco provides installation and services: one of the top three utilities in NL, more than 800 installers
- Working with BlueGeneration to accelerate sales, to fulfil their first order of 100 BlueGen units
  - 3 BlueGen units delivered, expect to deliver nine more in August
- VPP project

**zestiq**

**BlueGeneration**

**Eneco**

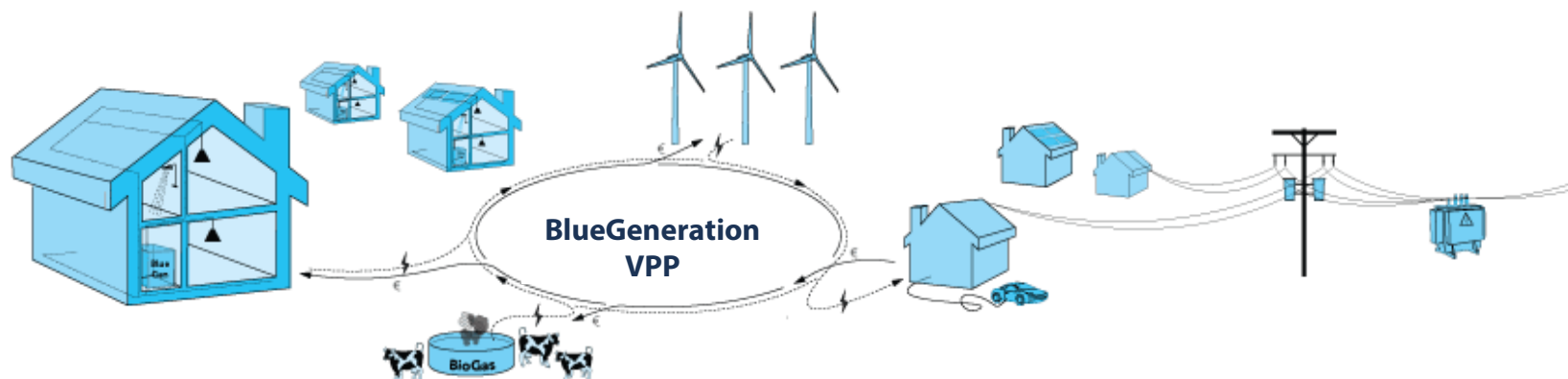


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# Netherlands – VPP Project

## BlueGen 'Energy Community'

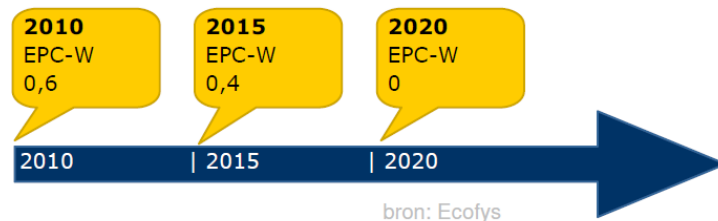
- BlueGeneration, Liander and IBM
  - Liander: NL network operator, 3 m electricity & 2.3 m gas customers
  - IBM provides system integration to control the BlueGen units
- Project began in April with successful modulation testing
- Plan to scale up in the second half of 2012 and into 2013



# Netherlands - energy efficiency

## Building standards require investment in efficiency

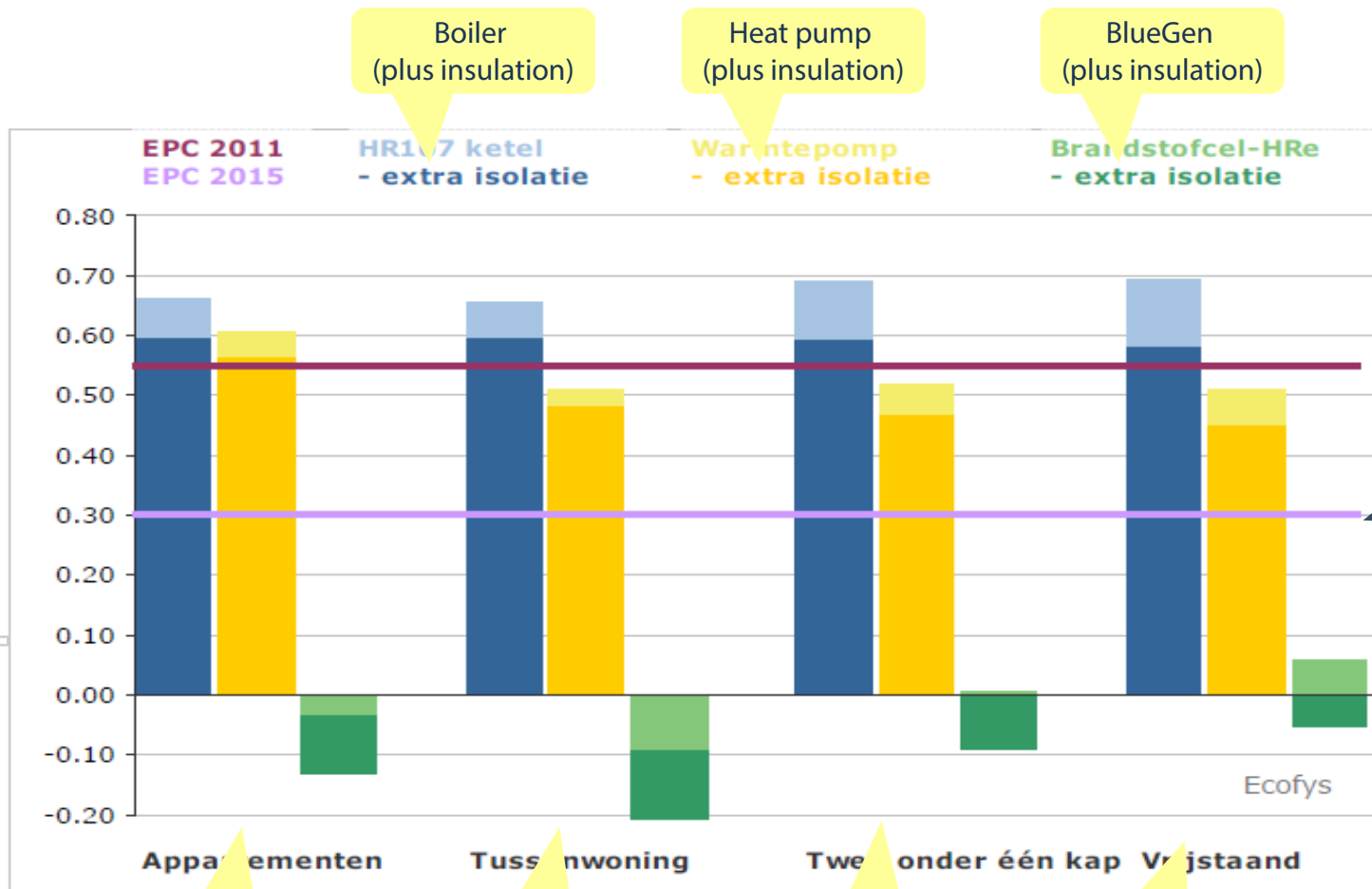
- Energy efficiency of new buildings calculated as 'EPC' value
  - EPC values must come down to 0.4 in 2015, zero by 2020



- Study by Ecofys on behalf of Gasterra shows that a building with a BlueGen already has a EPC value of less than one
  - BlueGen delivers a much better rating than a standard boiler plus insulation or a heat pump and insulation
- Existing buildings are given an energy label, from "A" to "F"
  - Ecofys study shows household with a BlueGen gets a "A++" rating

# Netherlands - energy efficiency

Ecofys study shows BlueGen meets 2020 standard for new building EPC rating



Boiler and heat pump do not meet 2015 standards. BlueGen is at 2020 standards.

Appartementen  
Apartments

Tussenwoning  
Terrace house

Twee onder één kap  
Multi family home

Vrijstaand  
Detached house



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# Australia

- Market settings – signs of life but still challenging
  - VCEC has recommended a feed in tariff in Victoria: final report due 27 July 2012
  - Clean Energy Finance Corporation: ideal way to deploy BlueGen into mass market, but political uncertainty over CEFC future
- 70 BlueGen units installed with customers in Australia
  - 30 units in social housing homes in Melbourne and Shepparton
  - 25 units in Newcastle with Ausgrid
  - 5 units in a commercial building in Port Adelaide
  - Other sites in Melbourne, Sydney, Canberra, Adelaide, Brisbane and Gosford
- Harvey Norman Commercial and Hills Industries focus on commercial and Government customers
- CFCL assessing a potential market introduction offer for local shareholders



# Other Markets

## North America



- SoCalGas testing a BlueGen in LA, from November 2010
  - SoCalGas is largest gas utility in US (~20 mil customers in CA)
  - Electric Power Research Institute and other utilities also involved
  - Validate BlueGen performance before larger field trials
- Extensive evaluation of the US market for BlueGen
  - Large market, but fragmented: 3,200 electricity utilities, 1,200 gas utilities
  - Energy market settings vary by State: many are still regulated
  - Best markets are California, North-East States, Texas
- Product approvals:
  - Exhaustive local requirements, different to EU and Australia
  - Working towards approvals – while resource priority is EU markets
  - Plan to finish certification during September
- Cost-effective approach to market development: support from Australia for now, invest in local resources later (with market demand)

# Other Markets

## Japan

- Tokyo Gas and Paloma have extended their BlueGen test programs
- Japan is one of the most developed markets for fuel cell mCHP
  - But it also has very comprehensive and prescriptive fuel cell standards
  - Very different to EU, Australian and North American requirements
- Regulated energy market
  - No power export to the grid
  - Installation of fuel cell devices is tightly managed by the gas utilities
- CFCL investment in the Japanese market is modest and appropriate to the nature of long-term testing and evaluation







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# Product Performance

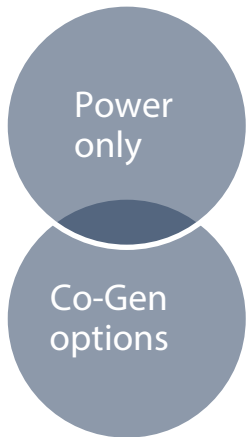
Real World Operation

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# Flexible Installation Options

## Flexible installation increases the addressable market



Power only	Integration	Simple Hot water	Multiple Hot water	Plus heating
<ul style="list-style-type: none"> <li>No heat recovery</li> <li>Brisbane, Port Adelaide</li> </ul>	<ul style="list-style-type: none"> <li>Integrated with solar PV, on-site batteries, EV charging</li> <li>Ausgrid Sydney, Alliander, Germany</li> </ul>	<ul style="list-style-type: none"> <li>Connected to tank, gas boost</li> <li>Home units in Australia, Germany</li> </ul>	<ul style="list-style-type: none"> <li>Several thermal inputs (e.g. solar or heat pump)</li> <li>Alliander, Germany</li> </ul>	<ul style="list-style-type: none"> <li>BlueGen integrated with thermal store for low energy homes</li> <li>Crest Nicholson home, UK</li> </ul>



# Flexible installation options

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# Commercial Building Retrofit

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Five BlueGen units installed in a 'green' redevelopment of a 1921 commercial building in Port Adelaide

*Units installed in March 2012*

BlueGen units, plus solar PV, designed to have zero operational carbon emissions and 5 star NABERS rating

*In first 3 months BlueGens have saved >7 tonnes of carbon*



# BlueGen-net

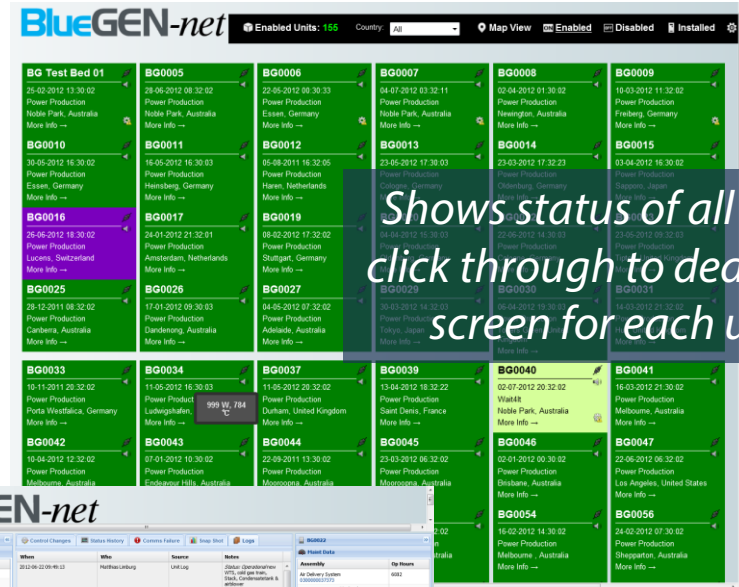
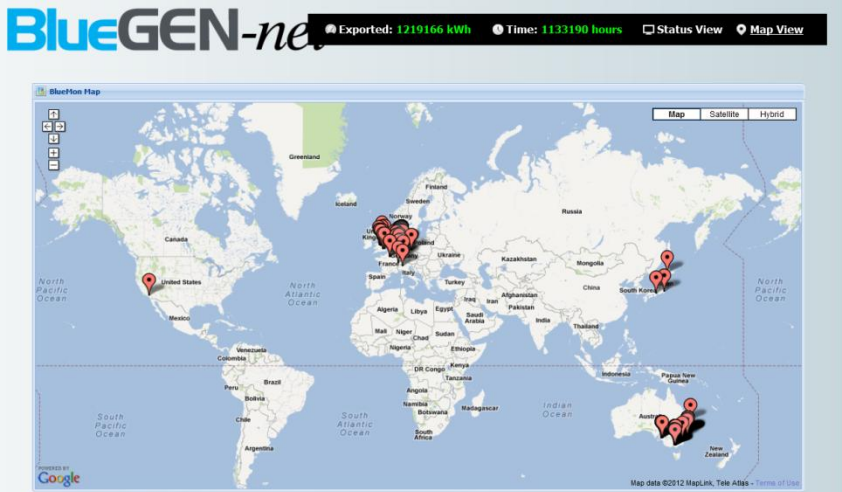
## Sophisticated online product maintenance system

- Each BlueGen and integrated mCHP unit is monitored and controlled remotely over the internet, through [www.bluegen.net](http://www.bluegen.net)
- Monitoring, managing, maintaining and controlling products on-line is important to:
  - Reduce marginal support cost
  - Create customer value, e.g. enables VPPs
  - Create positive customer engagement, through on-line data
- System developed by CFCL, all in-house IP
  - Up-front investment will deliver significant benefits as volumes increase
- Next version will give customers more control over the unit

# BlueGen-net

## On-line product monitoring and support by CFCL

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# BlueGen-net

## On-line performance reporting for Customers

### BlueGEN-net

Welcome **Matthias Anker** (ESS Properties) | [Edit Preferences](#) | [Help](#) | [Logout](#)

Select Unit :

**i Information**

Location : Adelaide, Australia  
Status : Power Export  
Export Mode : Constant

**Snapshot**

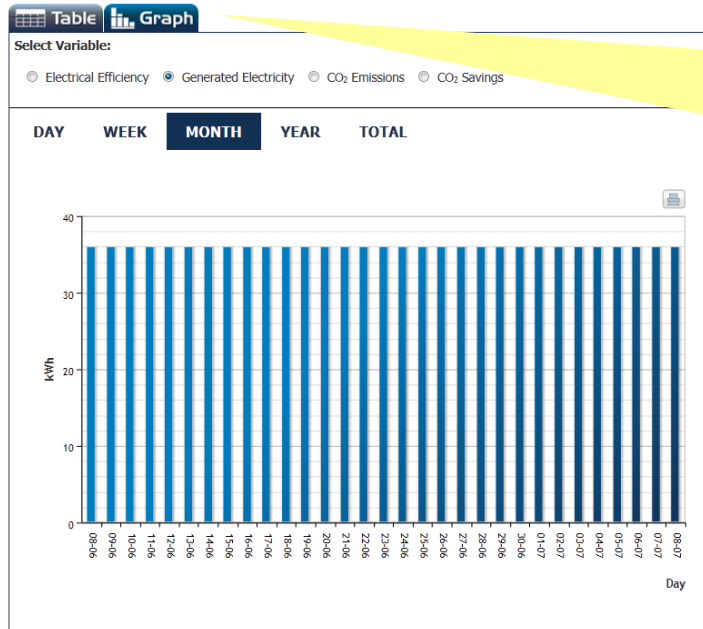
Electrical Efficiency	57.8	%
Fuel Input	2594	W
Electrical Output	1500	W

**Download**

From :

To :

Download Data



Real-time performance data:  
power generated,  
electrical efficiency,  
CO2 savings

Download historical data



# Product Performance

- Lots of testing in many real world sites: >1M hours since 2006
  - Handles variation in conditions and inputs (gas, water, air)
- Customer validation of performance:
  - 60% electrical efficiency confirmed by DBI (Germany)
  - 99% availability reported by EWE (Germany)  
(highest for all fuel cell mCHP products in the NOW program)
  - Power modulation ability confirmed by KIWA-Gastec (Netherlands)
- BlueGen products are performing as expected and performance continues to improve
- We continue to improve lifetime of fuel cell stacks



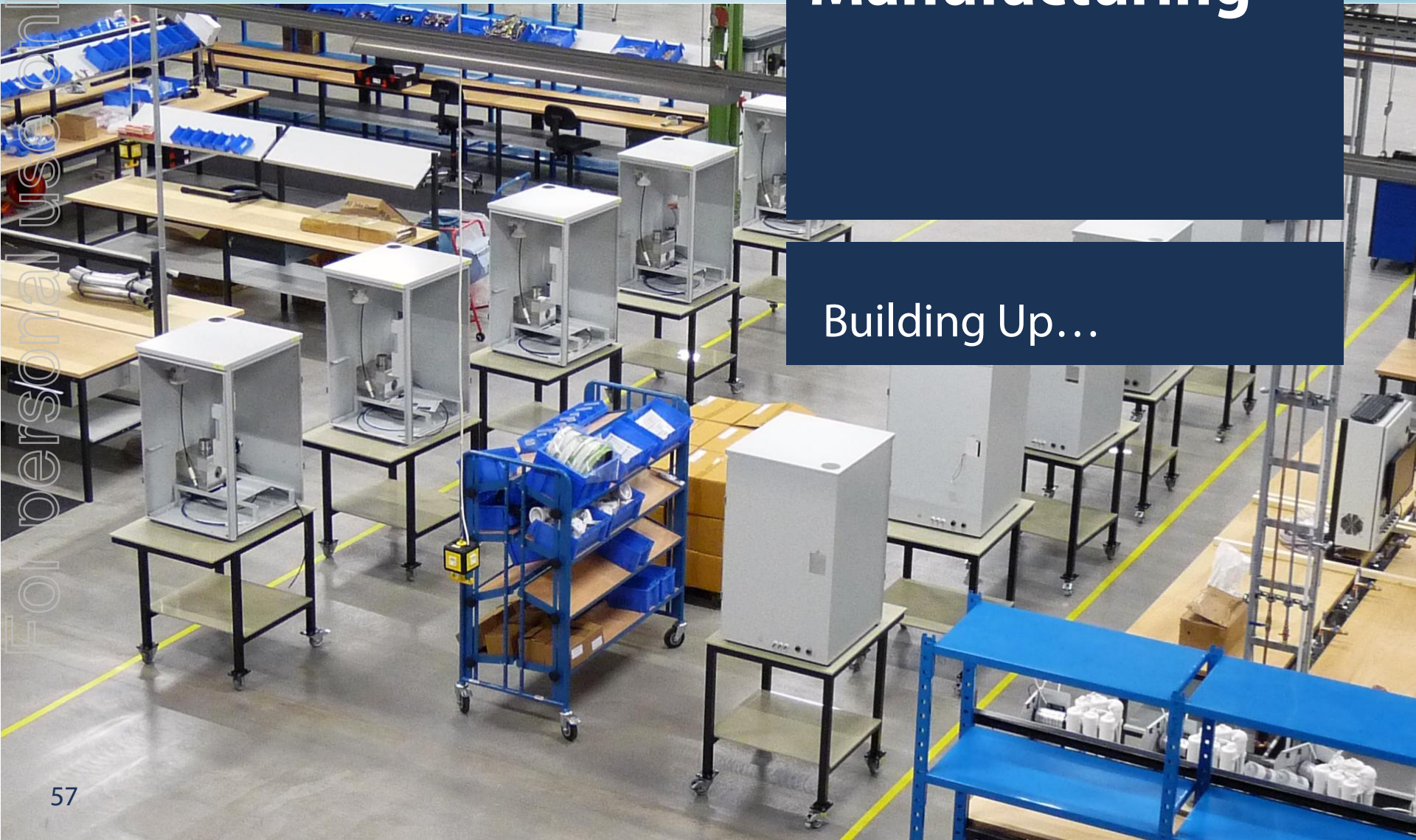




# Manufacturing

Building Up...

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# CFCL's current manufacturing facilities

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## Melbourne

- "Engine room for innovation"
- R&D team including 80 scientists and engineers
- Pilot manufacturing of fuel cells
- Testing facilities



## Shared Teams

- Manufacturing engineering
- Product quality control
  - Value engineering
  - Strategic outsourcing

## Heinsberg

- Semi-automated manufacturing of fuel cell stacks
- BlueGen assembly
- Final quality test of products
- Service and support hub for Europe

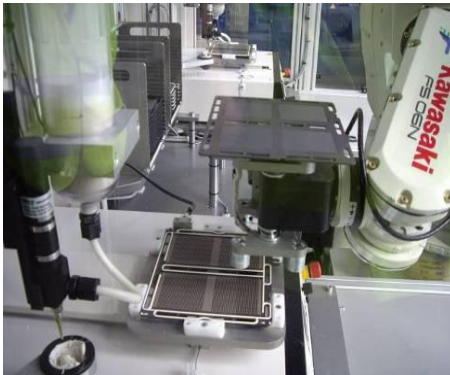


# Heinsberg plant



- Currently making ~6 fuel cell stacks & 5 BlueGen units per week
- With large furnace operating (target August), capacity increases to 1,500 BlueGen units per year
- Increase production beyond this without additional capex, through: operational efficiencies, flexible work practices, more outsourcing
- Next step: upgrade the 2nd large furnace = another 30-40 stacks per week, for total capacity of 3,000-3,500 stacks per year

## Automated stack production



## BlueGen assembly

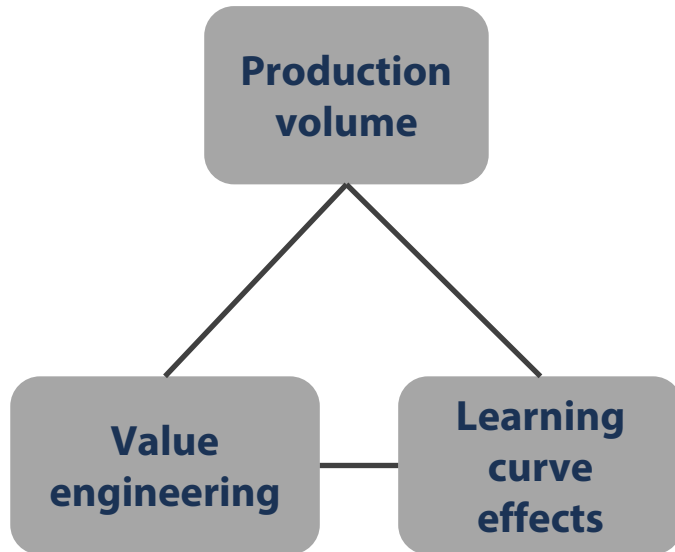


# Supply of main components

	Main Components	Currently	Supply Strategy
<b>Fuel cell</b>	Ceramic Powder	In-house & external	Source from market, commoditization
	Cell Production	External & CFCL Melbourne (to June 2012)	Outsource (from June 2012)
<b>Layer / Stack</b>	Assembly of layer set & stacks	CFCL Germany using external parts from CFCL Melbourne	CFCL Germany (target for 2013/14)
<b>Hot Balance of Plant</b>	<ul style="list-style-type: none"> <li>•Heat Exchanger</li> <li>•Burner System</li> <li>•Fuel Supply System</li> </ul>	CFCL Melbourne using external parts	Outsource (target for 2012/13)
<b>Gennex</b>	Module Assembly	CFCL Melbourne	Outsource (target for 2012/13)
<b>BlueGen</b>	Power management system	CFCL Germany assembly using external parts	Started outsourcing (target for 2012)
	Water treatment system	CFCL Germany assembly using external parts	Outsource (target for 2013/14)
	BlueGen assembly	CFCL Germany	Outsource (target for 2013/14)

# Driving down cost

## Cost-down drivers

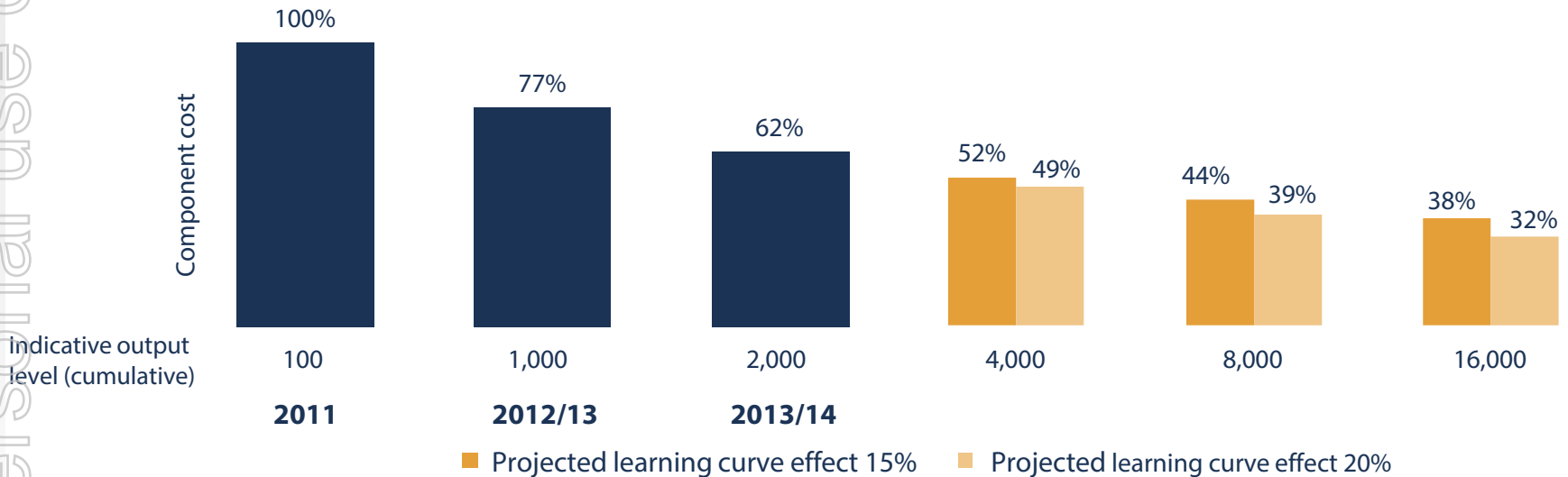


## Cost-down examples

Component	Cost saving short-term	% of BlueGen cost
Cells - ordering higher volumes with a lower cost supplier	50%	9%
Cabinet - ordering higher volumes with a lower cost supplier	65%	2%
Interconnect plates – value engineering & higher volumes	17%	8%
Insulation - higher volumes & value engineering	11%	4%

# Learning curve effect

## Unit costs reduce when volumes double



- BlueGen unit cost reduction of 25% achieved from FY 2011 to FY 2012/13
- Further cost reduction of 25% targeted for FY 2013/14
- Continuing cost reductions through: value engineering; continued outsourcing; larger volumes (learning curves from other industries, e.g. solar PV 15-20%)



# Financials

Revenue growth

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# Financials

- Revenue is growing
  - FY11 = AUD 3.6m (GBP 2.3m)
  - FY12 H1 = AUD 3.3m (GBP 2.1m)
  - FY12 = AUD 6.5m (GBP 4.3m) 75% increase from FY11
- Unit sales booked to revenue: 76 in June quarter, 169 for FY12
- Sales outlook for FY13 is strong, although revenue growth has not been fast enough to fund operating costs
  - Reducing operating costs
  - Pursuing several options to raise additional working capital
- We will keep shareholders informed about capital raising, plus usual financial reports:
  - June quarter cashflow report: before end of July
  - Preliminary Final Accounts for FY12: before end of August



# More information...

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The screenshot shows the homepage of the Ceramic Fuel Cells website. At the top left is the company logo, a blue triangle with a yellow circle inside, followed by the text "CERAMIC FUEL CELLS". To the right is a search bar labeled "Site search". Below the logo and search bar is a navigation menu with links: Home, About, Newsroom, Products, Partners, Info centre, Investors, and Login. The main content area features a large image of three people sitting on a green sofa in a modern office setting. To the right of the image is a blue box with the text: "We're changing the way electricity is generated, delivered and consumed." Below this image is a dark blue banner with the text "Register to receive our announcements via email" and a yellow "Sign up" button. Below the banner are three columns of content: "Announcements" with a megaphone icon, "Financial reports" with a line graph icon, and "About us" with a triangle icon. The "Announcements" column lists three items: "08 Dec 2011 Results of Rights Issue and Overseas Offer 6 Dec 2011", "05 Dec 2011 European approval for French m-CHP product", and "01 Dec 2011 Extension of Rights Issue Acceptances Dec 2011". The "Financial reports" column lists two items: "24 Oct 2011 Cashflow Report for the quarter ended 30th September 2011" and "19 Oct 2011 Annual Report for the full financial year 2010-11". The "About us" column contains two paragraphs of text: "World-wide, electricity demand is growing exponentially. Generating and consuming electricity more efficiently is central to reducing carbon emissions." and "Ceramic Fuel Cells is a world leader in providing clean, on-site electricity using fuel cells. With this advanced technology, we develop, manufacture, and market advanced products for micro-Combined Heat & Power (micro-CHP) and Distributed Generation applications."

## Andrew Neilson

Group General Manager Commercial  
Ceramic Fuel Cells Limited  
Email: [investor@cfcl.com.au](mailto:investor@cfcl.com.au)

## [www.cfcl.com.au](http://www.cfcl.com.au)

Register to receive Email Alerts  
News & announcements  
Webcasts

## [www.bluegen.info](http://www.bluegen.info)

Product information  
Carbon calculators  
Case studies

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# Appendix A

## Schedule of Patents

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# Patents (1)

Patent Title	Patent Granted In	Application Pending In	Priority Date	Earliest expiry date
Fuel cell interconnect device	AU, FR, DE, IT, JP, NZ, GB, US	-	15 Mar 1995	15 Mar 2016
A fuel cell assembly	AU, DE, GB, US	-	10 Jun 1997	10 Jun 2018
Electrical conductivity in a fuel cell assembly	AU, FR, DE, IT, NZ, GB, US	-	5 Sep 1997	4 Sep 2018
A heat resistant steel	AU, DE, JP, GB, US	-	17 Nov 1997	17 Nov 2018
Electrically conductive ceramics	AU, CA, FR, DE, IT, JP, NL, NZ, CH, GB, US	-	31 Dec 1998	23 Dec 2019
A fuel cell gas separator	AU, BR, CA, FR, DE, IT, JP, GB, US	-	4 Jun 1999	2 Jun 2020
Air-side solid oxide fuel cell components	AU, CA, FR, DE, IT, JP, ZA, GB	-	4 Jun 1999	2 Jun 2020



# Patents (2)

Patent Title	Patent Granted In	Application Pending In	Priority Date	Earliest expiry date
Fuel cell system	AU, CA, CN, IN, US	EP, JP	16 Aug 1999	16 Aug 2020
Laminated structure and method of forming same	AU, CA, FR, DE, IT, JP, ZA, GB, US	-	30 Dec 1999	19 Dec 2020
Surface treated electrically conductive element & method of forming	AU, AT, BR, CU, DK, CA, FR, DE, IT, JP, KR, GB, US	-	28 Mar 2000	28 Mar 2021
Fuel cell system	AU, BR, CA, CN, DK, FR, DE, IT, JP, NL, GB, US	NO	21 Feb 2001	11 Feb 2022
Liquid phase reactor	AU, CA, FR, DE, IN, IT, GB, US	JP	22 Mar 2001	22 Mar 2022
Seal for a fuel cell stack	AU, DE, GB	-	13 Jul 2001	13 Jul 2022
Fuel cell system and method for recycling exhaust	AU, CN, ID, JP	CA, EP, MY	31 Aug 2001	30 Aug 2022
Desulfurisation of fuel	AU, CA, US	EP, JP	25 Jan 2002	24 Jan 2023
Thermal management of fuel cells	AU, CA, JP, US	EP	31 Jan 2002	23 Jan 2023
Solid oxide fuel cell	AU, CA, JP, PK, TW, US	EP	4 Mar 2002	3 Mar 2023
Method of operating a fuel cell	AU, CA, FR, DE, IT, JP, GB, US	-	23 Apr 2002	22 Apr 2023



# Patents (3)

Patent Title	Patent Granted In	Application Pending In	Priority Date	Earliest expiry date
Fuel cell system	AU, CA, FR, DE, IT, GB, US	JP	21 May 2002	20 May 2023
Method of operating a fuel cell	AR, AU, CA, US	EP, JP	16 Jan 2003	15 Jan 2024
Fuel cell system	AU	CA, EP, JP, US	28 Jul 2004	28 Jul 2025
Steam generator	AU, CN	CA, EP, JP, US	19 Jul 2005	18 Jul 2026
Reactor control	-	AU, CN, EP, JP, US	4 Jun 2008	4 Jun 2029
Fuel cell stabilisation system and method	-	AU, CA, EP, JP, US	13 Jun 2008	12 Jun 2029
SOFC or SOFC sub-component and methods of preparing same	-	AU, CA, CN, EP, JP, US	9 Oct 2008	9 Oct 2029
A brazing process	-	AU, EP, JP, US	10 Jul 2009	9 Jul 2030
Thermal management in a fuel cell stack	-	PCT	15 Apr 2010	15 Apr 2031





# Appendix B

## Real World Case Studies



# Case study (1) - Ausgrid 'Smart Home'

- Renovated home in Sydney – showcase existing energy technologies
    - PEV, solar PV, energy storage, energy efficient appliances & BlueGen
  - The smart home is real – being 'road tested' by a family of three
    - Normal life, but... blogging about their experiences
- [www.smarthomefamily.com.au](http://www.smarthomefamily.com.au)



Sydney, Australia  
Ausgrid & Adams/Joyce  
Installed August 2010





# Case study (1)

## Installation photos

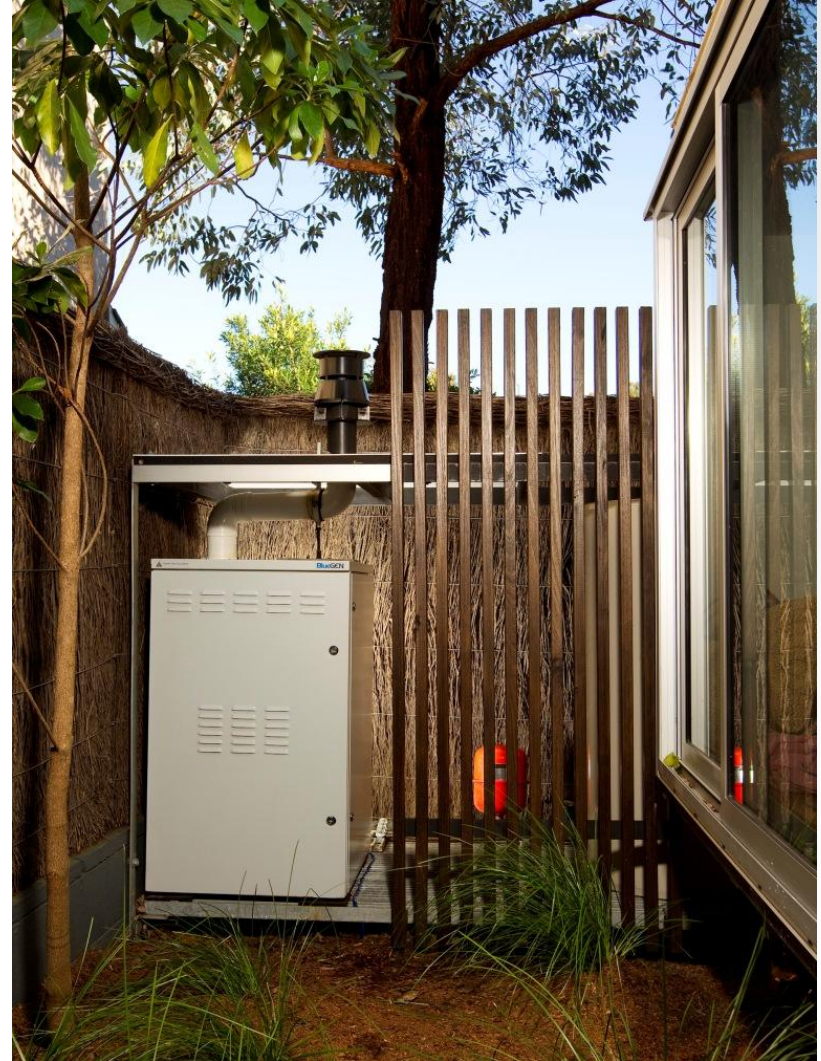
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200 litre hot water tank & booster



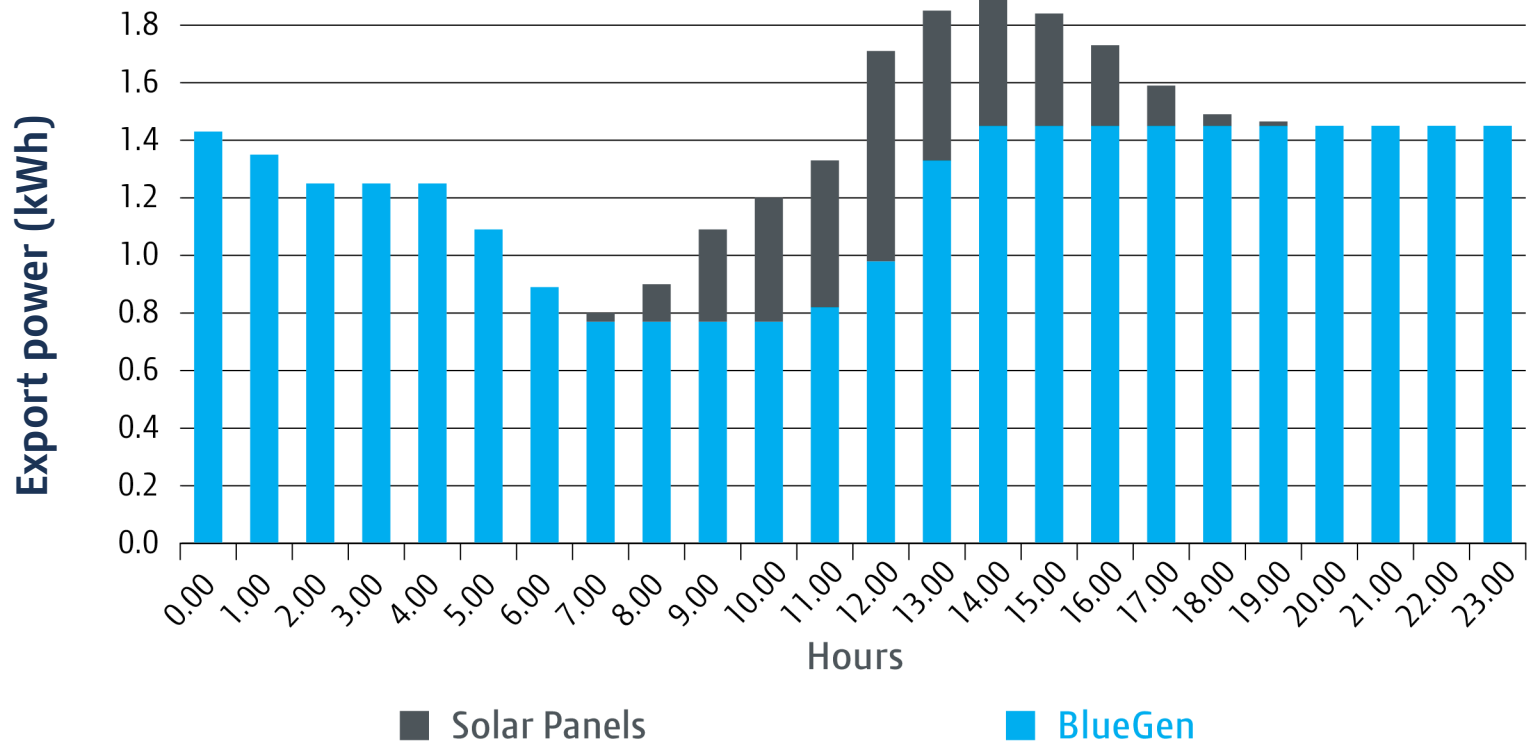
Courtyard installation



# Case study (1)

## Power modulation capability

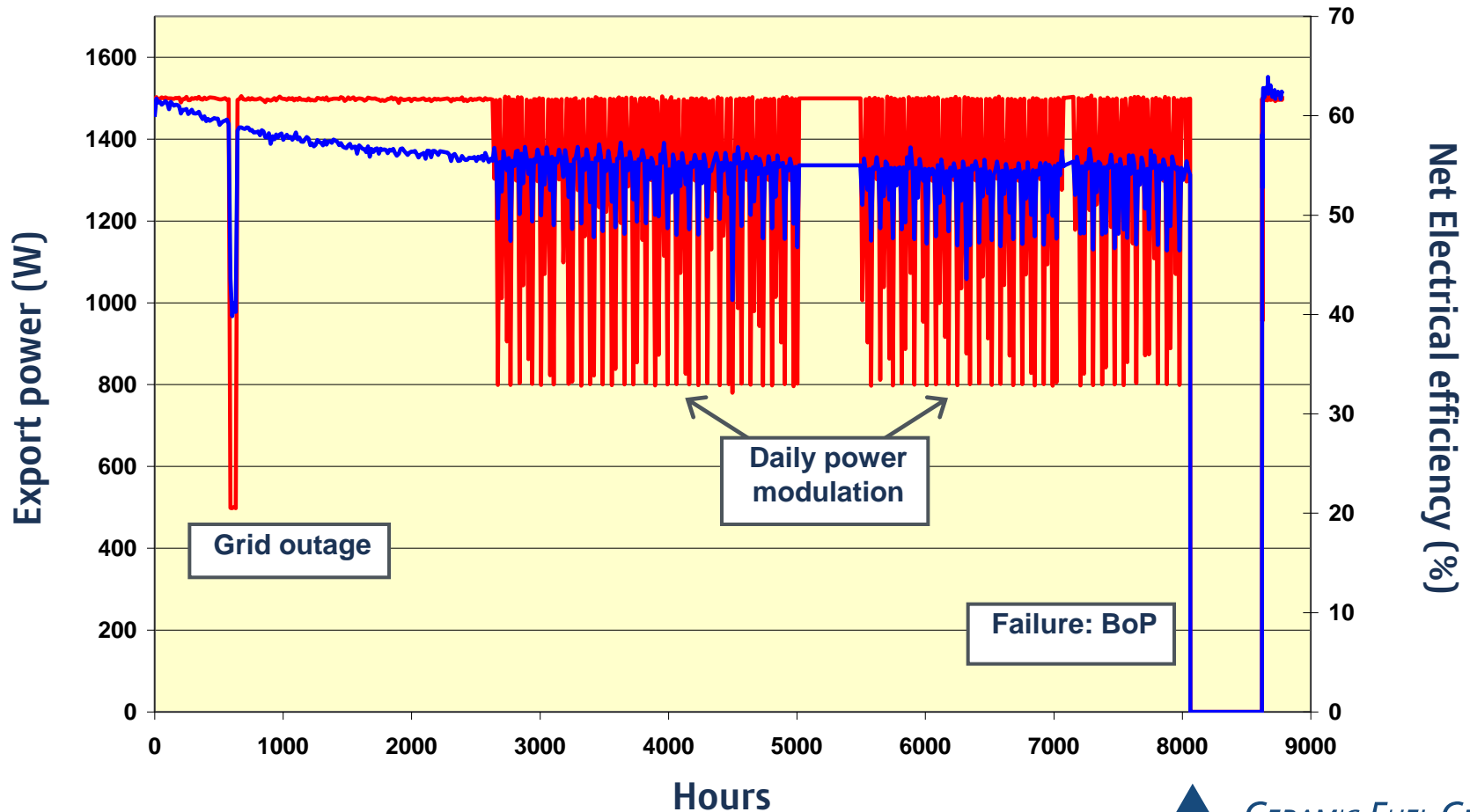
- Turn-up or turn-down the power output from BlueGen (prioritize PV)
- BlueGen & Solar PV in the Smart Home**



# Case study (1)

## BlueGen performance

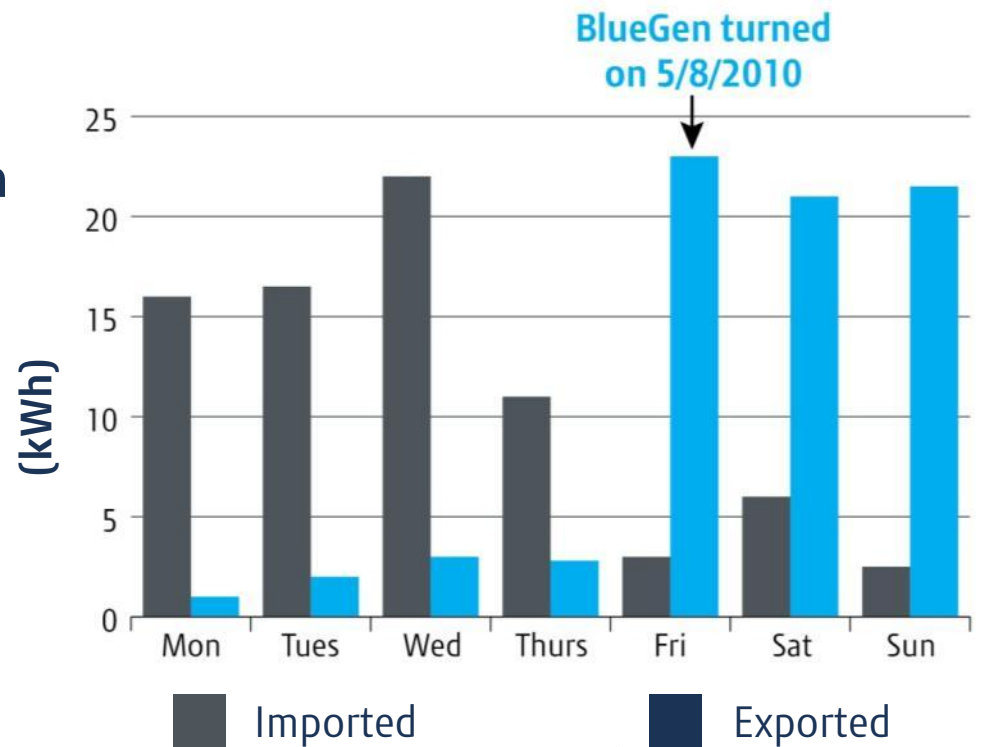
BlueGen #008 - Ausgrid



# Case study (1)

## Results after 18 months

- Run time of approx. 12,500 hours – with >95 % availability
- Exported approx. 16,500 kWh
- Av. electrical efficiency 54 %
- Saved ~11.2 tonnes of carbon
- Operation in varying modes
  - i) constant 1.5 kW
  - ii) daily modulation profile
- Testing power modulation



# Case study (2) - Adelaide

## Adelaide Electric Vehicle charging station

- Free EV charging station powered by BlueGen + the grid + solar PV
  - 1 hr stop allows 30km of low emissions driving
- City Council public showcase demonstration with real benefits
  - Base-load electricity for Adelaide Central Market when not charging EVs
  - Hot water for washrooms/cleaning staff



Adelaide, Australia  
Adelaide City Council  
Installed December 2010



# Case study (2)

## Installation photos



200 litre tank thermal connections



Adelaide Lord Mayor  
Stephen Yarwood



# Case study (2)

## Results after 12 months:

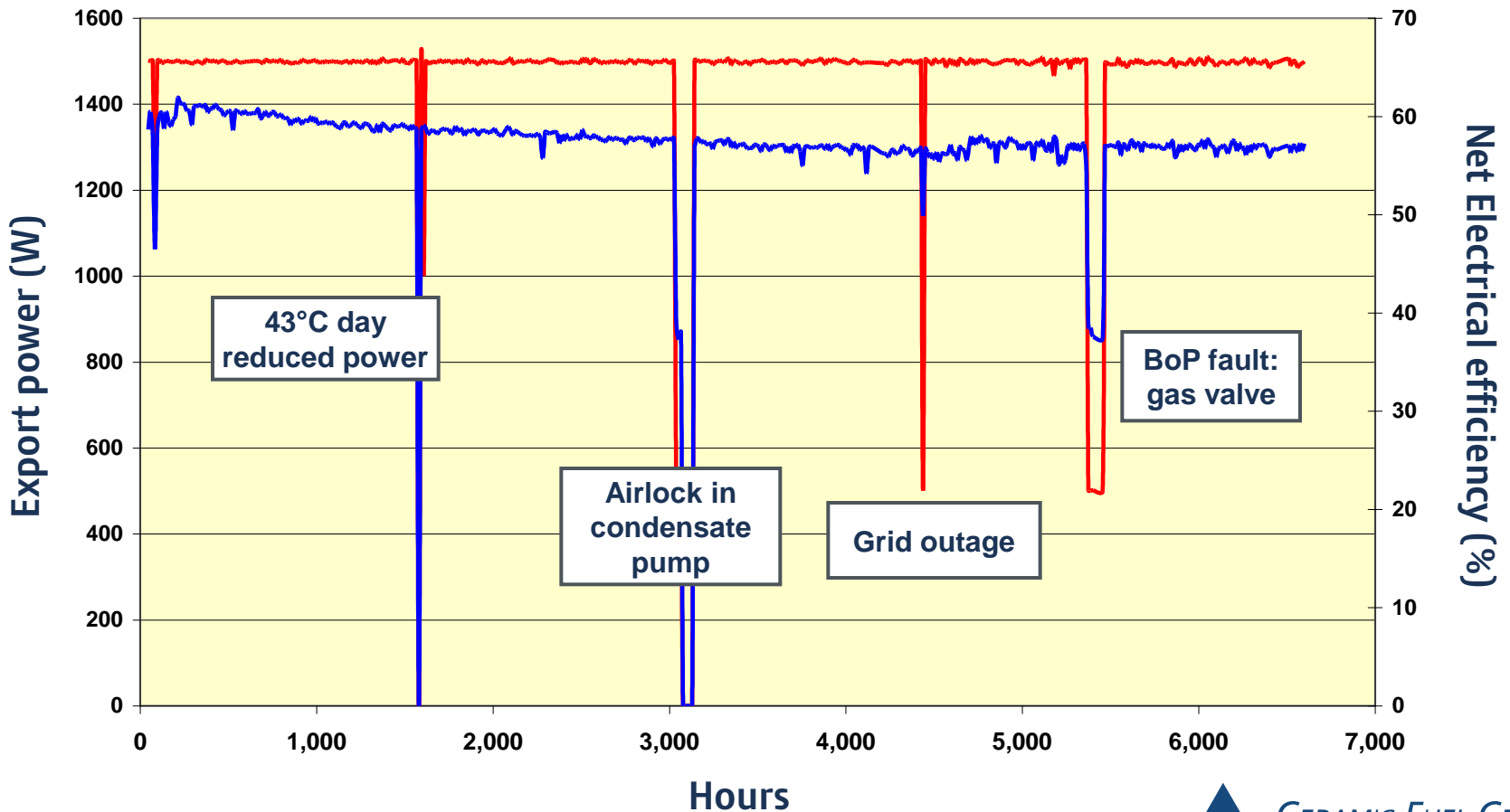
- > Runtime of approx 8,700 hrs
- > Exported approx 12,700 kWh
- > Saved ~5.7 tonnes of carbon
  
- > Produces electricity and hot water
  - Unused electricity fed back into the grid
  - Hot water made available or cleaning staff
  
- > Complements renewable energy
  - Working with 50 kW solar PV array on roof
  - Continuous low emission base load energy



# Case study (2)

## BlueGen performance

BlueGen #027 - Adelaide





# Case study (3) - Germany

## Alliander 'Energietisches Musterhaus' (model energy house)

- Former industrial park fire brigade renovated into an office
- Incorporates five different energy technologies
  - Solar PV, wind turbine, solar thermal, condensing boiler + BlueGen
- Understand how BlueGen interacts with other DG sources
  - Installed in the employee 'break room'



alliander

Heinsberg, Germany  
Alliander Netz AG  
Installed June 2010



# Case study (3)

## Installation photos

Indoor installation  
with 600 litre tank



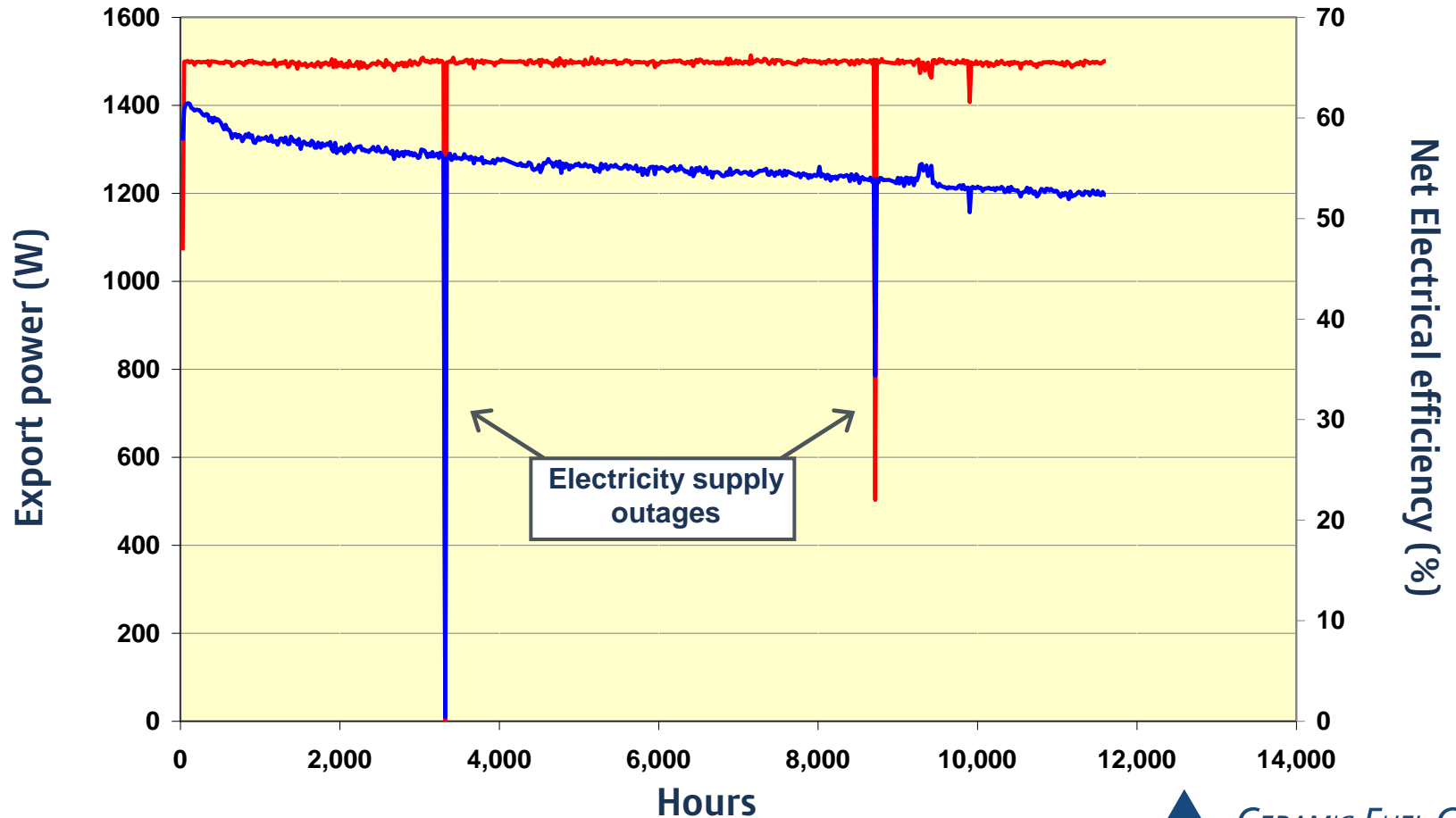
Alliander combines three  
renewable energy sources



# Case study (3)

## BlueGen performance

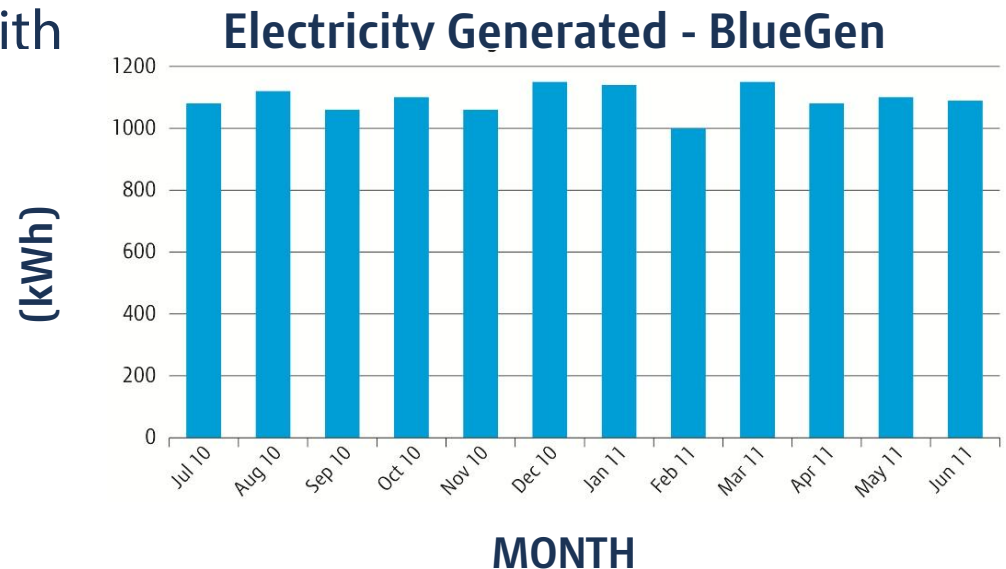
BlueGen #011 - Alliander



# Case study (3)

## 'Energietisches Musterhaus' results after 18 months:

- Run time of approx. 13,100 hrs – over 98% system availability
- 1.5 kW constant output – generating approx. 19,400 kWh
- Net electrical efficiency:
  - 60% starting efficiency to 50% after 18 months operation
- Thermal efficiency varies with building thermal demand
  - 15% to 25% depending on prioritisation of other heat sources



# Case study (4) - United Kingdom

## E.ON UK - Home of the Future

- BlueGen installed as part of E.ON/Channel 4 TV series
- BlueGen powering a variety of futuristic technologies in the home
- Located in corner of Perera family garage (<half square metre floor space)
- Exhaust vented externally with 'balanced flue'
- Eligible for Feed-in tariff under Microgeneration Certification Scheme (MCS)

Sheffield, United Kingdom  
The Perera family and E.ON UK  
Installed Jun-2011



# Case study (4)

## Results after 3 months:

- Exported approx 3,200 kWh
- Average electrical efficiency over 58%
- Saved 631 kilograms of carbon dioxide (excluding savings from heat recovery)
- BlueGen operating at 1.5 kW constant output
- BlueGen heat recovery combined with heat pump and solar thermal system
- [www.homeofthefuture.tv](http://www.homeofthefuture.tv)

