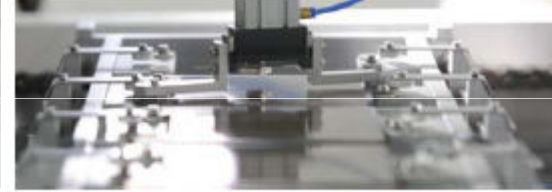
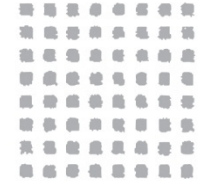


CeresPower



Fuel cell products for global energy markets

HEAT 09 Presentation

4th December 2009

Welcome to Ceres Power

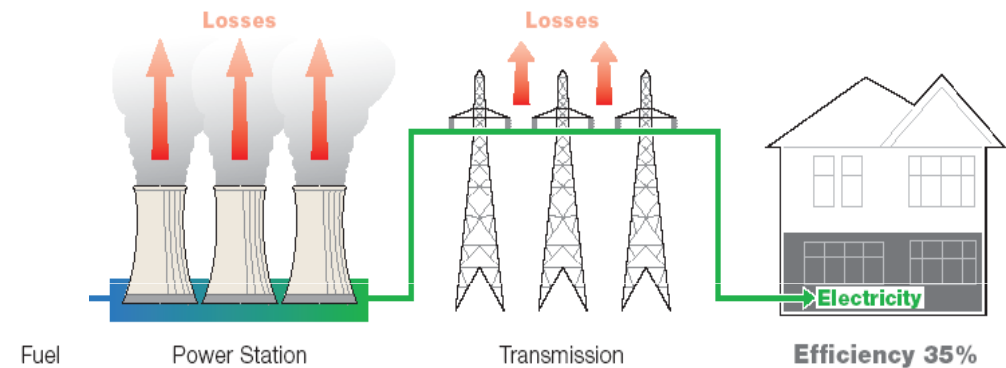
- Commercialising unique fuel cell technology within alternative energy products for global markets
- Company founded in 2001
 - Original IPR transferred from Imperial College, London
 - 2 rounds of private equity, followed by AiM flotation in 2004 (Mk Cap ~£130m)
 - Key shareholders include Oppenheimer, British Gas, Fidelity
- The organisation is focussed on:
 - Identifying market-led opportunities in volume sectors
 - Value-engineering fuel cell systems to meet market needs
 - Partnering with channel and supply-chain partners
- ~100 staff focussed into product teams, including experienced application development and manufacturing engineers from global product sectors (e.g. automotive, HVAC)



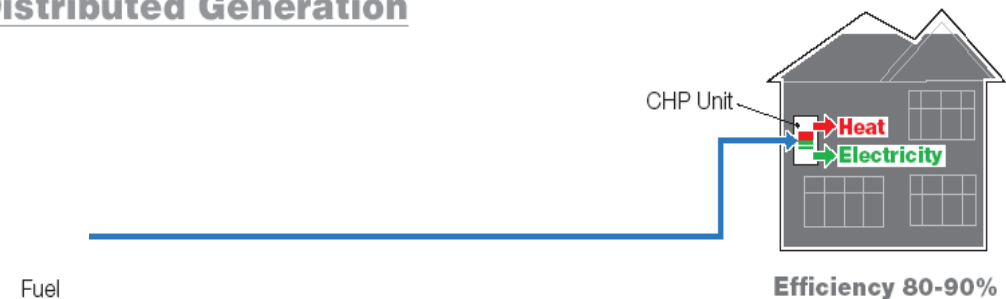
The Ceres Power DG Proposition

- Distributed Generation (DG): generate power at point of use, in the home
- Use a highly efficient process to reduce generating, transmission and distribution costs
- Capture heat output to drive further savings
- Package into a wall mountable consumer product
- A generation asset and demand reduction device

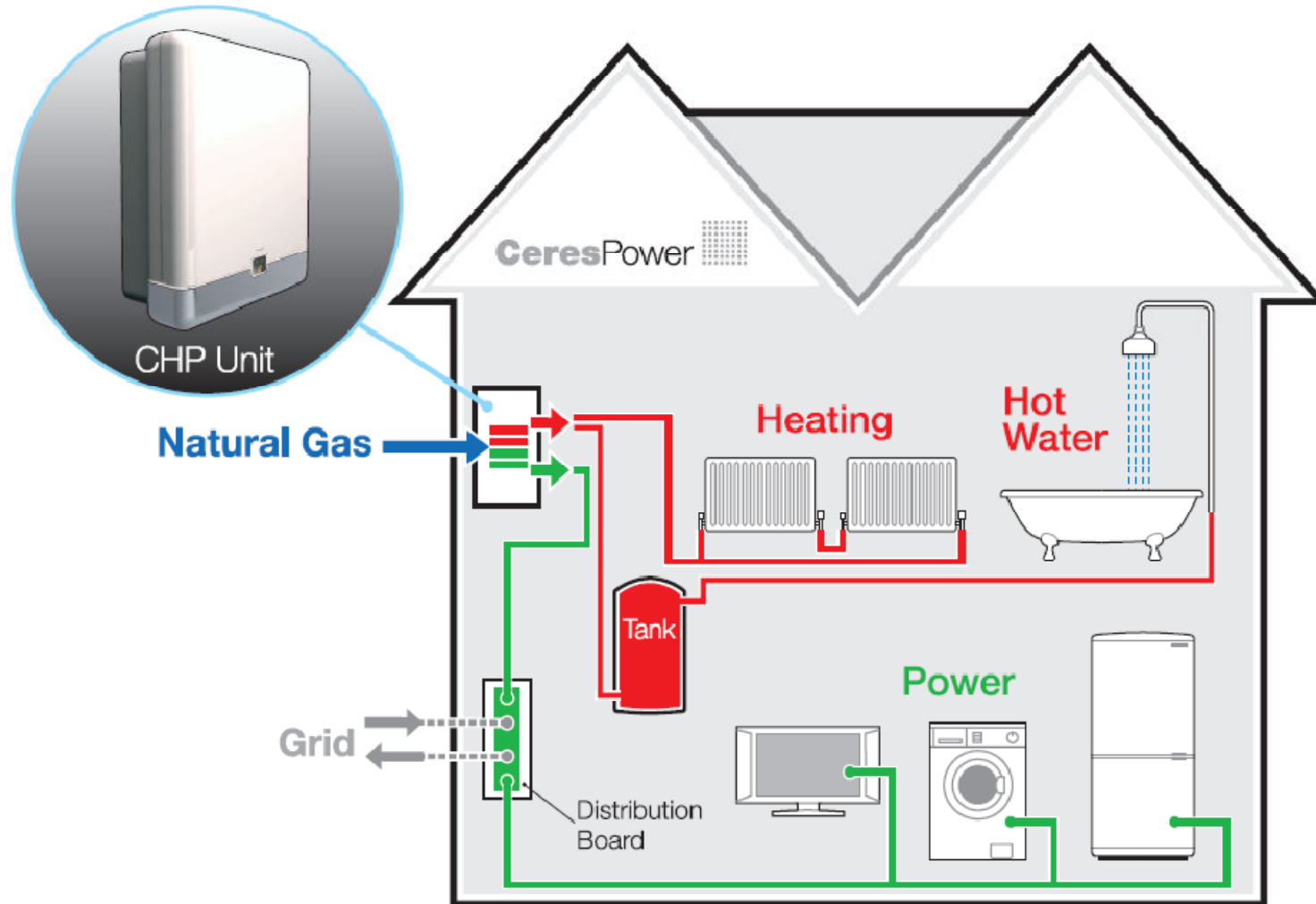
Centralised Generation



Distributed Generation



Fuel Cell microCHP in the Home



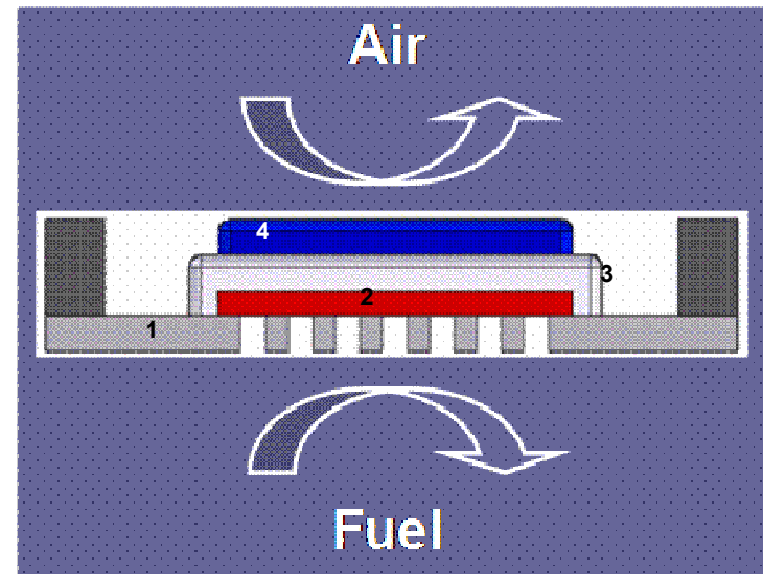
Fuel Cells

Fuel cells generate electricity & heat

- Operate on fuel and air
- Solid state reaction not combustion
- Near-zero NO_x, SO_x and CO

Fuel cell stacks are 'electrochemical engines' that are

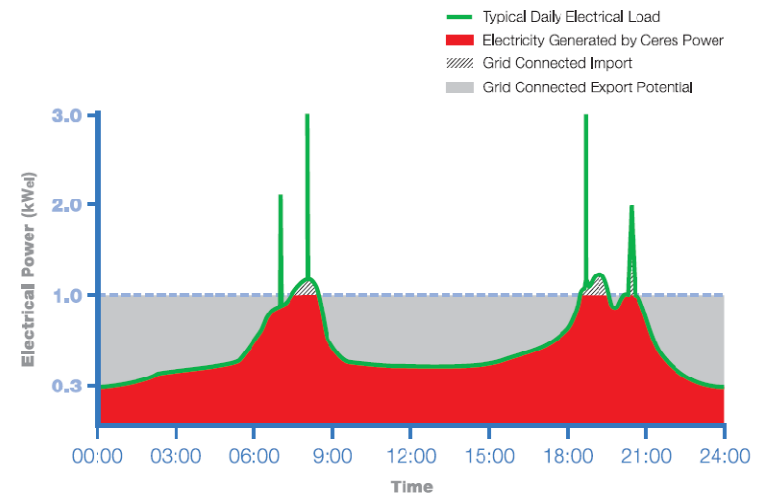
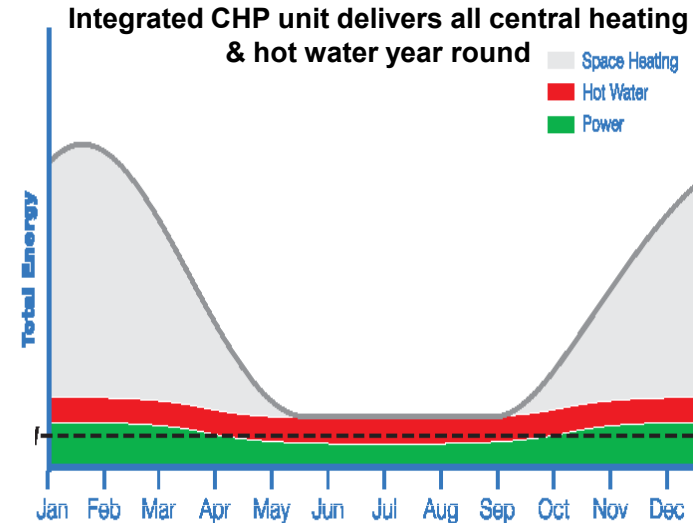
- Reliable and quiet
- Highly efficient
- Low emissions
- Modular



1. Support (stainless steel)
2. Anode
3. Electrolyte (CGO)
4. Cathode

Unique Technology Delivers Maximum Energy Savings

- **Low heat to power ratio:**
 - Enables all year round operation
 - Minimum heat output matched to summer hot water requirement
- **Load following & cycling:**
 - Delivery of high value electricity during peak demand
 - Compatibility with existing grid infrastructure (i.e. matched to national power demands unlike a base load generator)
 - Can be turned on and off as required
 - Maximum heat capture (electrically-led thermally capped)



CHP Unit installed in home-like environment



Predicted CHP Energy Savings Independently Confirmed

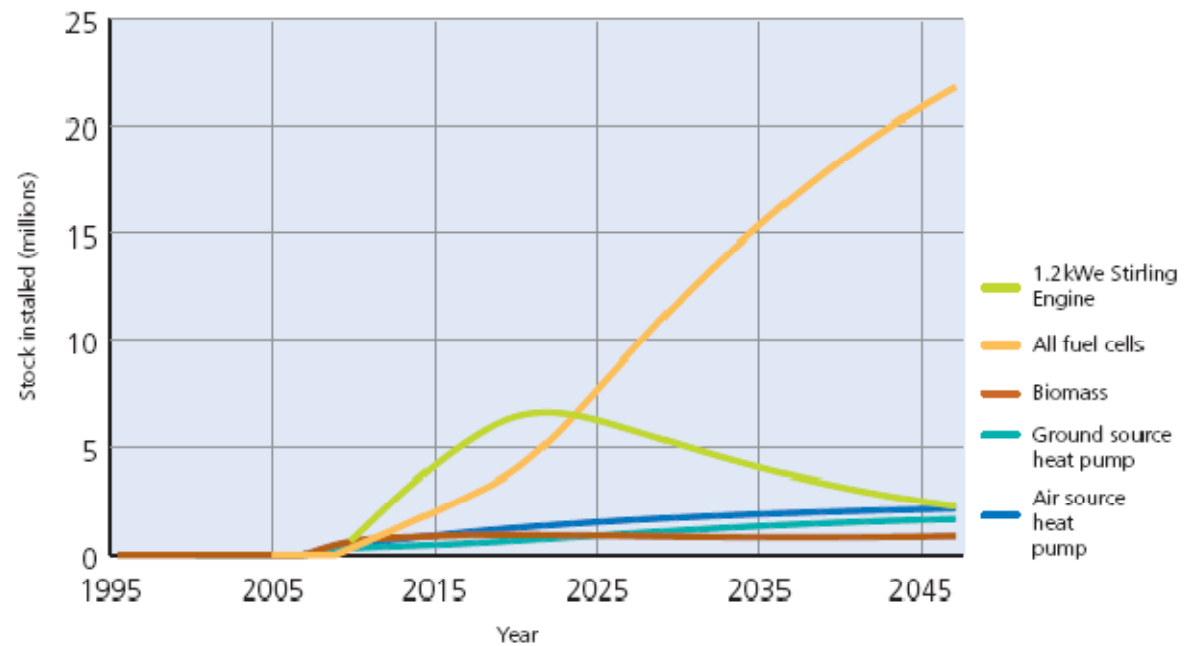
- **Independent confirmation by Element Energy**
 - Energy consultancy advising Government on low-carbon issues
 - Experts in energy use in buildings & techno-economic modelling
- **Element Energy confirmed energy savings potential based on**
 - Ceres Power CHP product's target performance, control strategy & operating characteristics
 - Measured energy demand in representative homes across UK housing stock
- **Annual predicted energy bill cost savings of ~ 25%**
 - Relative to high efficiency condensing boiler and grid-supplied electricity
 - Based on measured real home occupancy, actual energy demands, and usage patterns for mass market homes with occupancy of 2-3 persons
- **Mass market potential uptake for residential CHP in UK**
 - Completed detailed analysis & segmentation of UK housing stock
 - Mass market potential demonstrated for a product with Ceres-type characteristics

elementenergy

UK Mass Market Potential

Fuel Cell CHP optimises electricity savings and CO₂ emissions savings due to :

- All year round operation
- Load following capability



Source: Energy Saving Trust 2007 (study sponsored by UK government)

“Over 6 million fuel cell CHP units installed by 2020 (30% of the market...)”

2008 Element Energy Report for BERR

Predicted CHP Carbon Savings Independently Confirmed

- **Independent confirmation by Oxera**

- Macro economic consultancy specialising in energy sector
- Model of actual UK energy system including individual power plants (used by industry & Government)

- **Oxera confirmed carbon savings potential based on**

- Ceres Power CHP product's target performance and operating characteristics
- Predicted decarbonisation of centralised generation (incl. large-scale deployment of renewables and nuclear)
- Likely response of central generation to mass deployment of micro CHP
- Resultant likely CO₂ savings (taking into account current and projected 'merit order')

- **Annual carbon savings of 1 to 1.5 tonnes p.a. up to 2020**

- Relative to high efficiency condensing boiler and grid-supplied electricity
- Based on actual power plants displaced in the merit order

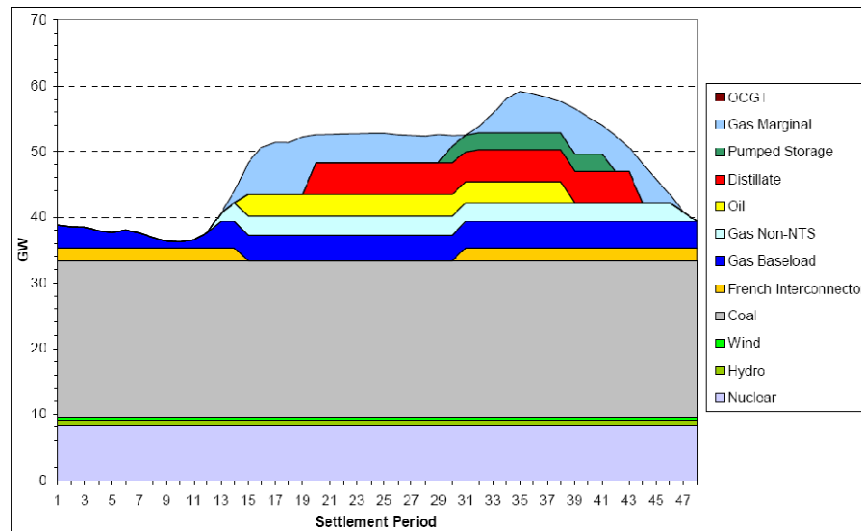
- **Potential for significant additional benefits to UK energy system**

- Reduces peak demand and generation investment requirements
- Reduces capex requirements for grid network



Persistent CO₂ savings even with a decarbonised grid

fcCHP reduces demand for central fossil fuelled generation, without displacing renewables or nuclear. Hence the CO₂ benefits of fcCHP are additive to those from other technologies, and persist even as the average CO₂ intensity of the grid decreases.



Prediction by National Grid of a likely merit order on cold winter weekday in the coming winter of 2009/10.

- The CO₂ savings from fcCHP are determined by the generating plant it displaces
- Which plant gets displaced is determined by the 'merit order'
- The position of generating plant in the merit order is determined by its marginal cost of generation
- Demand reduction by fcCHP reduces the operation of 'marginal plant' i.e. fossil stations

Carbon benefits of fuel cell micro-CHP

1. Highly cost effective CO₂ reduction for a difficult sector
 - *Retrofit of existing homes*
2. A major impact on CO₂ reduction by 2020
 - *Can be quickly deployed, compatible with majority of UK homes*
3. Persistent CO₂ savings even as the grid decarbonises
 - *Displaces peaking / mid-merit fossil plant*
4. Compatible with other carbon reduction measures
 - *E.g. nuclear, renewables*



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