

CHAPNET

Micro-CHP & Regulatory Issues

Chris Wilcox
Senior Consultant
EA Technology Ltd.

chris.wilcox@eatechnology.com

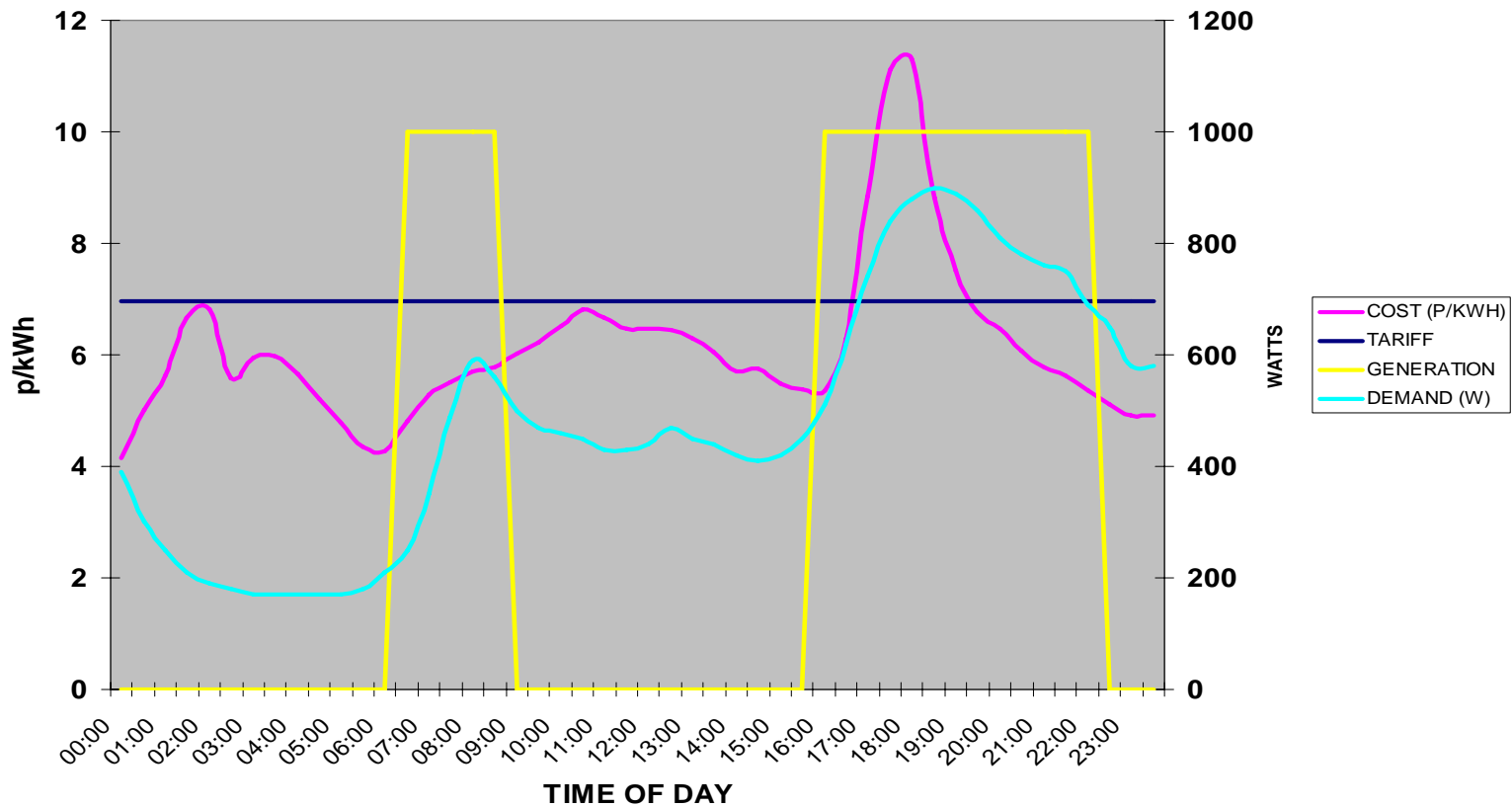
Tel +44 151 347 2354

Fax +44 151 347 2406

Why Do We Need Micro-CHP?

- To reduce CO₂ production
- To produce power efficiently
- To make money
- To help balance the network???

Coincidence of high cost with micro-CHP generation



Market Issues

- **MARKET**
 - Public attitudes to energy efficiency & new technology
 - Infrastructure
- **CONNECTION**
 - Interface (G83/1) / CEN
 - Impact on network
- **TRADING**
 - Billing, Metering, Settlement
- **TECHNICAL**
 - Cost / Performance
 - CE marking
 - Wiring regulations
 - Compliance to national standards
- **SKILLS**
 - Delivery chain
 - Installer training
 - Service support
 - Network operators
- **FINANCIAL SUPPORT**
 - Grants
 - Tax reductions
 - Green tariffs
- **LEGISLATIVE**
 - Regulatory
 - Legislation: must have CHP
 - CHP Directive
 - CHP strategy

UK Developments

- Energy white paper
 - Micro-CHP part of CHP target
 - Incentives for micro CHP - VAT reduction
 - Possible 4-6 Mtonnes less CO₂ via domestic sector
- Carbon Trust field trials
 - Evaluate performance of real systems
- DEFRA field trials
 - 6000 homes maybe...?
- DGCG activities
 - Distributed Generation Co-ordination Group

Domestic Sector Desired Incentives

- 5% VAT extended to all installations
- ECAs extended to all ESCOs
- Enhanced EEC (Energy Efficiency Commitment)
 - GB Energy suppliers must improve domestic energy efficiency (runs 2002 - 2005)
 - Government consultation completed Aug 2004 considering extension post 2005
- Energy labelling of products (A - F?)
- Reasonable return for export

Stirling Engine CHP Status



- DISENCO (SIGMA)
 - ($3\text{kW}_e / 9\text{kW}_{th}$)
- WHISPERTECH Mk.4
 - ($0.85\text{-}1.2\text{ kW}_e / 6\text{-}8\text{ kW}_{th}$)
- BG MICROGEN ($1\text{kW}_e / 5\text{-}36\text{kW}_{th}$)
- ENATEC ($1\text{kW}_e / 6\text{-}24\text{+kW}_{th}$)

Fuel Cell Status



VAILLANT (5kW_e)

BAXI /
EUROPEAN FUEL CELLS
(1.5kW_e)

SULZER HEXIS (1kW_e)

Other Technology Developments

- Prime movers
 - Rankine cycle (e.g. Baxi / Energetix)
 - *Some way off but developing fast*
 - ICE
 - *Honda trials in Japan*
 - *Baxi / SenerTec at 5 kW_e*
- Related (enabling) technologies
 - Real time communications
 - Domestic load management

CONCLUSIONS

- Will be a commercial impact on DNO
- Installation / service infrastructure
 - Training - chronic problem
- Technical standards - in progress
- Field trials - customer confidence
- Co-ordinated promotion
 - (CHAPNET / MicroCHEAP)

MORE OF THE SAME !

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Regulatory Summary

By Chris Wilcox

chris.wilcox@eatechnology.com

1. Current Status

1. CHP Directive
2. IEE Wiring Regulations
3. ESQCR
4. The DGCG
5. CEN / CENELEC
6. G83/1
7. Metering & Field Trials
8. Emissions Directive

2. Developments

- **Progress so far**

- ER G83/1 - Oct 2003
- Electricity Safety, Quality & Continuity Regs
- CEN Workshop Agreement
- Wiring Regulations
- ESCOs & the 28 Day Rule

- **Still to do...**

- CENELEC
- Standard Terms for Connection
- Metering

2.1 CHP Directive

ADOPTION

- Adopted by ministers Jan 2004
- Must be implemented by 2006

Targets Include:

- Establishing European wide method of making primary energy savings from CHP units in order to calculate CO₂ savings.
- To increase European CHP energy production from stagnant at approx. 11% to 18% by 2010.
- In order to achieve this - facilitate the access to grid system for micro-cogeneration units (below 50kWe)

2.1 CHP Directive

Member States' Obligations

- Guarantee access of CHP to grid under equitable conditions and guarantee conditions for competition
- Must evaluate and report progress of implementing directive & report on potential for expanded CHP use
- Micro-CHP should be evaluated as an efficiency measure for new buildings
- T & D operators must not impose unrealistic connection fees for units below 1MWe
- The Taxation of Energy Products Directive aims to identify CHP units that qualify for tax exemptions

2.2 IEE Wiring Regulations

- Guidance Note 7 “Special Locations” - Ch.18
- UK Guidance notes published 2003
- Exempt electrical output $\leq 16\text{A}$ at 230V
- Instead recommend G83/1 for guidance

Requirements:

1. Must self-disconnect on network failure
2. Installer must advise distributor of intention to use

2.3 ESQCR - 2002

Electricity Safety, Quality & Continuity Regs. 2002

- Exempt energy sources with electrical output not exceeding 16A at 230V
- Units should be type tested and **need not be individually witnessed**
- Must automatically disconnect (LoM)
- Must advise distributor of installation
- Disconnection can be via solid state switch if $V < 50$ within 0.5s, though mech. device pref.

2.4 The DGCG

- Distributed Generation Co-ordinating Group
- Jointly chaired by DTI and Ofgem
- The DGCG usually meets quarterly
- It will produce an annual report of its activities.

2.5 CENELEC / CEN

- CEN WA14642 finalised c. April 2003
- CENELEC now reviewing connection
 - programme likely to stretch over 2 years
- European Standard (EN) - Requirements for the connection of micro-generators in parallel with public low-voltage distribution networks

2.6 G83/1

- UK Guidance Notes prepared by EA
- Small-scale embedded generators
- Includes:
 1. Domestic CHP
 2. Hydro
 3. Wind power
 4. PV
 5. Fuel cells

2.6 G83/1

- G83/1 - gives information required by DNO
- Supplying information in this form should satisfy the legal requirements of DNOs
- ER G83/1 published Oct 2003
- ER G77 have been withdrawn

2.7 Metering & Field Trials

- Need for simple metering, settlement and trading
- Existing solution spill to grid
- Proposed P81 “chunked” export
- BEAMA/Elexon proposal for profile settlement
- Long-term solution with real time pricing?

2.8 Emissions Directive

Emissions Trading Scheme

- Will be piloted on CO₂ emissions in 2005-8
- Will include emissions from **combustion** CHP units of fuel input > 20MW
- Will include emissions from **any** CHP unit that is on an industrial site (e.g. refinery, steel works or paper mill)

3. Areas for Research

- Appliances - New Appliance Directive
 - Replaces Boiler Directive
- Gas Appliance Directive
 - Assume most problems now resolved
- Labelling
- Communication
- Dispatch of Energy on Utility's Demand
- Standardisation with Larger Units

4. Next Steps

- Final Workshops Planned Oct 25-26th 2004
 - Location: EA Technology, Chester
 - 25th Micro-CHP
 - 26th Pre-normative research
- Final wrap up in Brussels 9th November 2004

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THANK YOU

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