Opportunities and Barriers in the Microgeneration field: where might innovation help?

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Opportunities and Drivers

- ~24,000,000 homes in the UK
- ~23,850,000 homes with no Microgeneration technology
- ~23,000 schools with no Microgeneration technology
- 40% of Europe’s total onshore wind resource
- Temperate wet climate (relatively low heating and cooling needs)
- Solar resource of 1000kWh/m² - equivalent to 3300L of fuel oil per annum for each typical home
Opportunities and Drivers – cont.

- Government commitment to 80% reduction in carbon emissions by 2050
- EU target for UK for 15% of country’s energy from renewable sources by 2020
- ~£120,000,000 of direct grant funding since 2001
- ~£60,000,000 of the above still available
- Research funding programmes
- Zero carbon homes legislation
- Code for Sustainable Homes
- Localised planning requirements (Merton Rule)
- CERT Scheme
- Feed in tariffs announced
Barriers

• System Cost
• Relatively low fossil fuel energy prices
• Planning system (becoming less of an issue)
• Customer familiarity and confidence in new technologies
• Industry skills & capacity to deliver *volume at low cost and high quality*
Microgeneration Certification Scheme (MCS)

- UKAS accredited third party certification scheme offered by BRE Global Ltd
- Certificates Products and Installation companies against publicly available technical standards
MCS – cont.

Objectives

• To protect **consumers** from:
  – substandard installations;
  – “optimistic” energy generation claims.

• To inform **consumers** of the benefits of the technologies and approved products and installers;

• **Consumer** confidence will build a robust and stable market and benefit industry
MCS – cont.

• Manufacturers must:
  – Test products against international standards
  – Operate a QMS to ensure consistent quality of product
Installation companies must:
- Give customers a realistic estimate of the energy performance of the system
- Operate a robust complaints procedure
- Operate a QMS with documented procedures to control the design and installation process
- Operate a feedback process for continuous improvement
MCS – cont.

For the listing of BRE Global / MCS certificated products and installation companies see:

www.greenbooklive.com/microgen
Technology - Solar

- Components highly developed and relatively low cost
- Main costs:
  - Installation labour
  - Roof access
- Thermal storage
- Drive to modular approach
- Minimising required skill level of installation operatives or
- Using existing on-site trades
Technology – Solar PV

- Components high cost
- Main costs:
  - PV modules and cells
- New technologies with lower cost to manufacture
- Building integration to offset other building components
- Using existing on-site trades
1) Ground source heat pump

Natural temperature at >1 metre below surface is a constant +10°C. Plenty of heat energy – but at too low a temperature

*low grade heat*  
*useful heat*

Coefficient of Performance: can be better than 3.5
3) Air source heat pump

Ambient temperature ranges from typically -10°C to +30°C over a year. The higher the ambient temperature, the better the COP.

**Coefficient of Performance:**
Cold weather: ~3 or lower; mild weather: ~5
Technology – Heat Pumps

- Components well developed and relatively low cost
- Main costs:
  - Optimising with heating distribution system
  - Installation in terms of Air Source
  - Ground collector costs in terms of Ground Source
- Reduce cost / disruption of boreholes
- Improve seasonal CoP
Technology – Micro Wind

• Components high cost
• Main costs:
  – Wind turbines and inverters
• Mass manufacture to reduce cost
• Improve performance in sub-optimum locations
• Improve noise issues
• Building integration / augmentation?
Technology – Micro Wind cont.
Technology – Biomass

- Components highly developed, comparable cost to oil, not gas.
- Main costs:
  - Boiler
  - Fuel storage
  - Flue arrangements
- Supply chain for processed fuel (pellets)
- Improve usability and storage requirements
Technology – Micro-CHP

- For houses with higher than average heat demands
- Main costs:
  - CHP unit
- Optimise for best power-to-heat ratio
- Logic control to maximise run-times
Help for innovation

- Pure research:
  - Universities such as:
    - *Nottingham SBE*
    - *Loughborough CREST*
- Applied near market from BRE
  - Due Diligence
  - Certification
  - Regulation compliance
  - Help with collaborative funding (Technology Strategy Board)
  - BRE Ventures – Innovation Den