



The need for a microgeneration strategy

Readily available heat and power are taken for granted in developed societies. As we become less tolerant to fluctuating temperatures in our homes and more reliant on products requiring electricity, demand for heat and power is likely to grow even in the face of increasing strides being made in greater energy efficiency. Yet the context to this growing demand is one where the UK will no longer be a net exporter of oil and gas, where there is increasing urgency in the need to tackle climate change and rising energy prices are hitting the most vulnerable. Meeting these challenges will require a portfolio of measures, including energy efficiency, renewable energy and other low/zero carbon energy sources.



Microgeneration technologies have significant potential as a part of this portfolio. This chapter examines the overall policy context and the justification for greater efforts being made to promote the use of microgeneration.

The policy context

The Energy White Paper set the framework for future UK energy policy. It set out four goals for energy policy:

- Putting the UK on a path to cut its carbon dioxide emissions by some 60% by about 2050, with real progress by 2020

- Maintaining the reliability of energy supplies
- Promoting competitive markets
- Ensuring every home is adequately and affordably heated.

This strategy is being written at a time when progress against these goals is being assessed and policies are being updated and strengthened in order to ensure that we achieve our short, medium and long term goals.

The current Energy Review⁵ is examining progress against the Energy White Paper goals and will set out in more detail the long-term policies now considered necessary to achieve them. This Review will provide the long-term context for the microgeneration strategy. It is not possible to pre-empt this Review. But the microgeneration strategy has been written in consultation with the team working on the Review.

The Climate Change Programme Review⁶ has assessed progress against our targets for reducing harmful greenhouse gas emissions and has led to an updated Climate Change

⁵ www.dti.gov.uk/energy/review/index.shtml

⁶ www.defra.gov.uk/environment/climatechange/uk/ukccp/review.htm



Programme, focusing on measures to achieve our interim 2010 target of reducing carbon dioxide emissions by 20%. That Review did not look in detail at microgeneration. The updated Climate Change Programme does, however, acknowledge the importance of microgeneration, particularly in terms of meeting longer term emissions targets, and this strategy for the promotion of microgeneration will form part of the updated Programme.

At the time of announcing the amendments to the Building Regulations that will come into force in April 2006, ODPM also announced a review to identify further measures that could be taken to address the sustainability of existing housing stock⁷. Among other things, this review will look at what could be done to

encourage homeowners to install microgeneration on existing buildings. Measures coming out of this review will be built into this strategy.

In October 2005 the Biomass Task Force led by Sir Ben Gill submitted its report⁸ to Government proposing a set of recommendations to optimise the contribution of biomass energy to renewable energy targets and sustainable farming, forestry and rural objectives.

A number of the recommendations have direct relevance to the promotion of small-scale biomass and measures adopted in this area will complement this strategy.

In Wales, the Sustainable Development Action Plan⁹ states, as a top ten commitment, that the Assembly

Government and its agencies will encourage the development of an indigenous microgeneration renewable industry in Wales.

Climate change - the imperative for action

One of the major causes of climate change is the increase of greenhouse gases in the atmosphere. The concentration of CO₂, the main greenhouse gas, has risen by more than a third since the industrial revolution from a pre-industrial level of around 280ppm to approaching 380ppm today. The rate of build-up is increasing and is currently around 2ppm per year.

There is no international consensus over what is an acceptable increase in greenhouse gas concentrations. For CO₂ a level of 550ppm, double the pre-industrial level, has been discussed. The EU has reaffirmed its view that the global average mean surface temperature increase should not exceed 2°C and that stabilisation well below 550ppm CO₂ equivalent is likely to be needed to achieve this¹⁰. The Royal Commission on Environment and Pollution concluded that for the UK, stabilisation implied cuts of 60% from 1990 levels by 2050 and 80% by 2100¹¹. But more recently, the conclusions of the G8 Science Conference in



⁷ www.odpm.gov.uk/index.asp?id=1002882&PressNoticeID=1954

⁸ www.defra.gov.uk/farm/acu/energy/biomass-taskforce/

⁹ www.wales.gov.uk/themessustainabledev/index.htm

¹⁰ Council of the European Union, December 2004

¹¹ *Energy - the changing climate*, 22nd Report of the Royal Commission on Environmental Pollution, June, 2000



Exeter in 2005 concluded that a stabilisation of 450ppm is necessary to have a reasonable chance of remaining below a 2°C rise in the global mean temperature.

The built environment (domestic, commercial and industrial premises) accounts for around 47% of CO₂ emissions in the UK. Microgeneration technologies have the potential to reduce this figure by providing low carbon sources of heat and electricity to houses, buildings and small commercial premises. The EST study commissioned by DTI suggests that by 2050 widespread installation of microgeneration could be reducing household carbon emissions by approximately 15%.



Microgeneration also has a wider contribution to make in helping to win the battle for hearts and minds that is crucial in terms of encouraging people to change their behaviour and move towards reducing overall consumption of energy. A recent report by the Sustainable Consumption Roundtable¹² suggests that the “qualitative impacts of microgeneration technology can be substantial, presenting a living, breathing and emotionally engaging face to energy consumption”. The report also states that “some of our sample were only producing very modest levels of energy through their microgeneration technology, yet the behavioural impacts in terms of energy awareness and efficiency were often still considerable”.

Reliable energy supplies

DTI projections see total final energy consumption in the UK increasing by about 13% between 2000 and 2020 with electricity generation increasing at a slightly lower rate (around 10%) to 381TWh in 2020 compared to 346.3TWh in 2000¹³. These projections also suggest that the UK will remain dependent on fossil fuels for most of its energy needs over this period. The direct use of natural gas is expected to account for 34% of final energy consumption by 2020 and 58% of electricity generation. The other major source of energy is oil, accounting for 47% of demand in 2020, mainly for transport applications.

With the UK no longer a net exporter of oil and shortly to lose that status in respect to gas it is clear that, in common with most countries, we will be reliant on external energy supplies for meeting our future energy demands.

If we could apply microgeneration technologies in a cost-effective way, this utilisation of our own extensive natural resources would reduce import dependence and benefit energy consumers. These technologies also have the advantage of producing heat and electricity close to the point of use, so avoiding the losses that occur in the transmission of gas and electricity.

¹² <http://sd-commission.org.uk/publications.php?id=239>

¹³ DTI - *Updated Emissions Projections (Final projections to inform the National Allocation Plan)*, November 2004, www.dti.gov.uk/energy/sepn/uep2004.pdf and www.dti.gov.uk/energy/sepn/uep_addendum.pdf



Tackling Fuel Poverty

Recent estimates suggest energy price increases might have increased the number of vulnerable households in fuel poverty (i.e. those which are spending more than 10% of their income keeping the house at a reasonable temperature) in England by up to one million between 2003 and 2006¹⁴. Many of these households are in homes that are not connected to the mains gas network (research has indicated that of 9,000 communities of 50 or more houses that are not connected to the gas network, 4,300 are more than 2km from a gas main and are therefore less likely to be economically viable for connection).

The 2004 Living in Wales survey¹⁵ estimated that 130,000 Welsh households live in fuel poverty. A full report analysing the fuel poverty statistics by categories such as household age and composition, property age and type is being

commissioned by the Welsh Assembly Government. This report will update the fuel poverty figure to take into account increases in incomes and fuel prices since the property survey took place. The report will also model future fuel prices to produce scenarios of the number of households who might be in fuel poverty to 2010.

Local authorities are starting to look at microgeneration technologies as possible measures that could help to tackle fuel poverty, particularly for those households not connected to the grid network. For example the installation of ground source heat pumps can allow households to heat the

house at a cost lower than the Winter Fuel Payment - meaning that pensioners can effectively get free heating. This relies on the authorities bearing the cost of the installation. But with energy prices currently rising and the households remaining in fuel poverty tending to be the homes that are harder to treat through traditional methods, microgeneration technologies are starting to become a real option.

DTI's Design and Demonstration Unit will shortly begin two demonstration projects in partnership with the Regional Development Agencies in the North East and Yorkshire & Humberside. These projects will evaluate the efficiency and cost-effectiveness of a range of renewable technologies that can be deployed at the community level to provide cheap, sustainable energy for deprived communities. This will involve setting up new social enterprises¹⁶, which will be established as Community Interest Companies to ensure that they operate for the benefit of the community.

Community-scale microgeneration and renewables in schools

Promoting microgeneration is not just about promoting installations in individual houses or small businesses. The installation of microgeneration technologies in a community setting, including



¹⁴ This includes the effects of increases in incomes, but does not include improvements in energy efficiency as a factor

¹⁵ <http://www.wales.gov.uk/keypubstatisticsforwalesheadline/content/housing/2005/hdw20051202-e.htm>

¹⁶ www.sbs.gov.uk/socialenterprise



social enterprises is also important - in terms of reducing carbon emissions and engaging the public in tackling climate change. Between the Clear Skies and Major PV Demonstration Programmes we have funded 617 projects demonstrating renewable technologies in schools and other community buildings. An attractive community installation can familiarise local residents with microgeneration technologies, demonstrate the potential for home generation and maybe even encourage people to change their own behaviour to be more energy efficient.

Renewable Energy in Schools

Education of the next generations in a way that energy efficiency and the need for cleaner energy become an integral part of their mindset can help to influence their future behaviour (and maybe even that of their parents) and move us towards the desired cultural shift. One of the most effective ways to engage the interest of children in the energy agenda

must be through interaction with new technologies. The installation of renewable technologies in schools can bring the curriculum to life in ways that textbooks cannot. With schools often being the focal point of communities, the installation of renewables could help to shape attitudes in the wider community.

The Low Carbon Building Programme will allocate some of its £80m for microgeneration

installations in schools. This will make some in-roads but is almost certainly not enough to meet demand. Which is why we will be working directly with industry on a Renewable Energy in Schools scheme. A number of companies have already committed to contributing funds, products or organisational expertise and we will be working with those companies, and any others which come forward, to develop a scheme that brings maximum benefit to schools.

Action: DTI and DfES will work with industry and other key stakeholders to develop a scheme for installing microgeneration technologies in schools.

Microgeneration - the way forward

It is clear that microgeneration has a key role to play in meeting our future energy needs in a way that is sustainable, reliable and affordable for all. Furthermore the visible and personal nature of many microgeneration technologies can also enhance the individual's interest in, and understanding of, energy consumption more generally. Its use in schools can create an enhanced underlying understanding of energy issues and climate change amongst future generations of consumers, helping to influence future behaviour patterns.



Other countries have already identified certain microgeneration technologies as having significant benefits.

In Germany around 150,000 people now work directly or indirectly in the renewable energy sector with an annual turnover of 12 billion euros and Germany's microgeneration strategy has played a significant part in this. The market incentive programme granted funding to nearly 300,000 applications in solar panels, small installations for burning solid biomass, heat pumps and energy saving measures in



buildings worth 550 million euros as well as setting ambitious targets through the '100,000 roofs programme' which promotes photovoltaic installations for electricity generation with the goal of reaching 1000 MW capacity at which point, Government subsidy will end. Japan has also led the way in PV, installing 200,000 PV rooftop systems by 2004 through its 'sunshine programme'.

Since the 1970s various policy instruments in Sweden have made heat-producing technologies competitive with fossil-fuel based methods and now over 10% of all households in Sweden use heat pumps.

Canada has done significant work on reducing the regulatory and technical barriers for wind turbines, fuel cells and household PV systems believing that uniform installation standards will allow for better market penetration, higher volumes, more research and more competition, all of which will drive costs down.

In the UK in recent years Government and Ofgem have taken a number of policy initiatives forward, in close association with key industry players (see Annex A). Including the commitment, between 2000-06 of £53.5m of funding for small-scale renewable installations. This money was split between three programmes:

- £10m has funded PV field trials through a domestic scale programme and a large-scale programme. This programme has run since 2000.
- £31m funded the Major PV demonstration programme which has run since 2002 and has currently provided grants to 1735 projects.
- £12.5m was allocated to the Clear Skies Initiative for household and community renewables projects. This programme has provided grants to 6434 schemes since 2003.

Our support for these technologies will continue through the Low Carbon Building Programme, which will provide £80m over 3 years between 2006 and 2009.

But it is clear that some barriers still remain, requiring further measures to ensure that this important new sector can fulfil its potential. We need to put in place measures that both develop the UK market and that help UK companies become better placed to compete abroad.



This cross-Government strategy will draw together individual policy strands to ensure a properly co-ordinated approach that also involves Ofgem, the microgeneration industry and other key stakeholders.

An Action Plan to reinforce these measures in Wales, and facilitate the uptake of microgeneration technologies, is being developed by the Welsh Assembly Government. This plan will be compatible with this strategy.

Later Chapters in this strategy examine in more detail the Government support required and what steps need to be taken to create a sustainable market in these technologies.

Summary Box

- Energy policy in the UK is facing a number of challenges - an increasing urgency in the need to tackle climate change, rising energy prices hitting the most vulnerable and becoming a net importer of oil and gas.
- The Energy White Paper set the framework for future energy policy. The Energy Review, the Climate Change Programme Review, the Government response to the Biomass Taskforce Report will all build on this framework.
- Microgeneration technologies have the potential to make a significant contribution to our energy policy goals of tackling climate change, ensuring reliable energy supplies and tackling fuel poverty.
- Microgeneration installations in community buildings such as leisure centres and schools provide the opportunity to both reduce carbon emissions and engage the public in tackling climate change.
- Countries such as Germany, Sweden and Canada have identified certain technologies as having significant benefits and have specifically targeted them for support.
- It is important to put in place measures that develop the UK market and that help UK companies become better placed to compete abroad.

