The Institution of
Engineering and Technology
Michael Faraday House
Six Hills Way, Stevenage
Hertfordshire SG1 2AY
United Kingdom
T +44 (0)1438 313311
F +44 (0)1438 765526
www.theiet.org

The Knowledge Network

Ref: S784/gb/gn

Energy Efficiency and Microgeneration Strategy
Energy Efficiency Unit
Scottish Executive
Enterprise, Transport and Lifelong Learning Dept.
2nd Floor, Meridian Court
5 Cadogan Street
Glasgow G2 6AT

29th May 2007

Dear Sirs,

Re: Energy Efficiency & Microgeneration – A Strategy for Scotland

The Institution of Engineering and Technology (IET) is pleased to respond to the Scottish Executive's consultation on "Energy Efficiency & Microgeneration – Achieving a low carbon future – A Strategy for Scotland".

The IET believes that a sustainable and effective policy on energy needs to follow an "energy hierarchy", which aims to limit the demand for energy first, before seeking to meet the (reduced) demand by cleaner means. Viewed from this perspective, the Scottish Executive holds within its remit the primary policy levers for achieving its goal of a low carbon future, and should use this major opportunity to create the bedrock of a sustainable energy policy.

As a technology organisation the IET recognises that when aiming to achieve energy efficiency and sustainable energy use, technology is often the easy part. Putting in place the right policies to stimulate interest in the adoption of existing energy efficient technologies and behaviours is a challenging task, requiring strong political will, co-ordination across industry sectors and political levels, and concerted long term educational programmes to change society's attitude to energy use. Underpinning, these behavioural changes will need to be a workforce skilled in point of use system design, installation, commisioning and maintenance of low carbon energy systems in industry, offices, activity centres and in the home.

The IET supports microgeneration *as part of a broader energy efficiency and carbon abatement policy*. We foresee that the relatively high cost of microgeneration technologies will result in incremental, rather than exponential growth in this area. The primary goal should be to ensure that there are no unnecesary obstacles constraining the growth of microgeneration and that the costs and benefits of specific microgeneration technologies are properly treated in the market place.

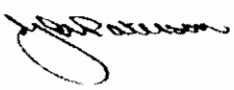
The IET is the largest engineering body in Europe, representing over 150,000 members in the global engineering and technology sectors. It was formed in March 2006 from the merger of the Institution of Electrical Engineers (IEE) and the Institution of Incorporated Engineers (IIE). The IET acts as an independent and authoritative voice for the profession, and aims to provide policy makers and the public with reliable and factual information on engineering and technology issues. This response has been prepared on behalf of the IET Trustees by the Engineering Policy Group – Scotland based upon policy guidance from the IET Energy Sector Panel and Environment and Energy Expert Group. (More information on the IET's

policy process in these sectors can be found at:
http://www.theiet.org/publicaffairs/sectorpanels/energy/index.cfm)

The IET is submitting a response in the form of an Annex which addresses a number of the questions raised in the consultation document, where the IET considers itself qualified to contribute to the consultation process. No part of this IET response is confidential.

If you require further information or amplification of any aspect of this response, or would like to arrange a meeting with the members of our policy groups, then please do not hesitate to contact me.

Yours sincerely,



Graham Paterson
Head of Policy
Tel: 01438 765685
Email: gpaterson@iee.org.uk

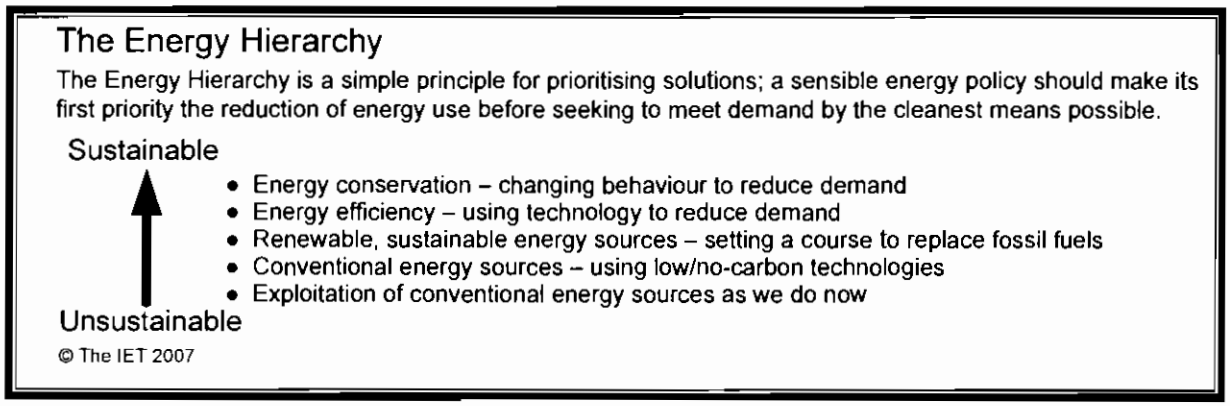
ANNEX S784

IET Submission to the Scottish Executive on their consultation "Energy Efficiency & Microgeneration – Achieving a low carbon future – A Strategy for Scotland"

1. Do you agree with the overall approach taken in this draft strategy for improving energy efficiency and encouraging greater uptake of microgeneration? If not, why not?

The IET is encouraged by the determination of the Scottish Executive to adopt a strategic approach to energy efficiency and microgeneration that recognises the behavioural as well as the technological dimensions of this policy area. Below we comment on a number of technological considerations arising from the consultation proposals, to aid the Executive in designing an effective implementation regime. We also highlight some of the implications for the cultural and behavioural dimensions of energy efficiency and microgeneration policies.

The IET believes that a sustainable and effective policy on energy needs to follow an "energy hierarchy", which aims to limit the demand for energy first, before seeking to meet the (reduced) demand by cleaner means (see below). In accordance with this principle, **we advise that priority be given to energy conservation (behavioural) and energy efficiency (technological) measures, followed by microgeneration where appropriate.**



Energy Conservation and Energy Efficiency

As an institution devoted to the promotion of technology the IET has long recognised the technological potential for energy saving. We also recognise, however, that when it comes to achieving energy efficiency and sustainable energy use, technology is often the easy part. Putting in place the right policies to stimulate interest in the adoption of energy efficient technologies and behaviours is a challenging task, requiring strong political will, co-ordination across industry sectors, and concerted long term educational programmes to change society's attitude to energy use. Consumers should be encouraged and offered the means to take a more active role in managing their energy usage.

The potential for energy saving is very considerable, but crucially dependent on public engagement for its delivery. The Oxford Environmental Change Institute suggest that the theoretical potential for savings based on current energy energy efficient technology is in the region of 50% (http://www.eci.ox.ac.uk/lowercf/40house.html) Based on historical experience, however, there is a great deal of uncertainty surrounding the rate at which savings can be delivered, and a commensurate need for explicit government commitment to achieving it.

Sustained educational initiatives promoting personal and community responsibility for energy conservation will be key to arresting the long-term trend for increasing demand, although the promotion of best practice offers a shorter term solution. More regular, accessible and user-friendly information on energy use through improved billing and the introduction of 'smart' metering solutions will undoubtedly support this effort, but will not deliver savings as a stand-

alone measure. It will have to be implemented as only one dimension of an integrated effort to inform and educate people and organisations about energy management.

Reducing energy use in buildings is clearly an important priority. Given the low replacement rate of the building stock, it will be important in addition to more stringent standards for new buildings to strengthen incentives for the improvement of existing buildings. Cost-effective technologies and materials exist to implement both strands of this policy, but decisive measures need to be put in place to promote their use. For building standards to deliver real results it is essential that they be accompanied by a well-resourced inspection and enforcement regime. Severe shortcomings in compliance with the energy standards in the Building Regulations are well documented and should serve as a cautionary tale[1].

In the longer term, adopting a "whole building" approach to measuring and rewarding the energy performance of buildings would pay the highest dividends. Technology such as 'smart' metering (above) could provide a means for monitoring the actual operational performance of buildings. Such measurements would encompass the use of energy-using equipment, which is currently a growth area both in homes and in workplaces not covered by Building Regulations, and as well as providing an assessment of energy-using behaviours (see note1).

Microgeneration

The IET supports the strategic approach proposed by the Scottish Executive to promoting microgeneration in light of its potential to contribute to achieving the goals of UK energy policy. Potential benefits of microgeneration include:

- exploitation of dispersed energy sources (particularly renewables);
- local exchange and storage of surplus electricity, minimising transmission/distribution costs and losses;
- utilisation of locally generated heat;
- improved resilience to disruption through self-sufficiency; and
- indirectly, greater end-user engagement in energy management, potentially resulting in the adoption of more energy efficient practices and a reduction in overall energy use.

However, the potential costs and benefits of different microgeneration technologies are technology, scale and location specific. They should be assessed in the context of an integrated view of the energy system in order to ensure that their more widespread adoption results in genuine efficiency improvements, better use of resources and net emissions savings. We also stress that policies promoting microgeneration should be nested within a policy hierarchy which prioritises the reduction of overall demand for energy[2].

As noted in the consultation Scotland is well placed to use small isolated renewable generation systems with its island communities. The power distribution system in some areas of Scotland is weak and extra care will be needed for connecting microgeneration safely.

In seeking to capture the potential benefits of specific microgeneration technologies, the policy framework should recognise the crucial part played by appropriate and correct installation and operation, because actual performance depends very heavily on these

[1] These arguments are pursued in greater detail in the IET's submission to the recent DCLG consultation on "Building a Greener Future: Towards Zero Carbon Development": http://www.iee.org/policy/submissions/sub781.pdf.

[2] The IET's detailed views on Microgeneration and Distributed Generation are expressed in a recent submission to the DTI's consultation on Distributed Energy: http://www.iee.org/policy/submissions/sub770.pdf .

conditions[3]. This implies that it will be necessary to ensure that potential users have access to sound advice, that resources are available for the careful and skilled design and installation of each system, and that a competent and trained technician or installer base emerges to service the market. Many types of microgeneration equipment currently reaching the consumer market is not simply 'plug and play' but requires proper assessment and (e.g. in the case of CHP) modification to the domestic hot water system by a skilled installer. The implications of a microgeneration strategy are potentially significant in terms of a rapidly emerging demand for a specialised labour base. Public confidence in, and appetite for, new technologies will depend in large part on the availability of reliable technical support. Co-ordinated government-industry intervention may be required in order to take advantage of the employment potential, and ensure that a potential skills shortage does not create a further barrier.

In terms of the 'deliverability' of a microgeneration policy, the IET cautions that market barriers will inhibit the rapid, widespread introduction of microgeneration technologies. The public's purchasing decisions are likely to be informed by factors including the capital cost and perceived benefits of available technologies. Its attractiveness to potential purchasers will also depend on issues such as future gas prices and the potential effect of large-scale public installations. While the first adopters will be motivated primarily by the environmental benefits, shorter payback times, a simplification of regulatory arrangements and a transparent regime of rewards for export of electricity will be essential preconditions for attracting a critical mass of consumers. However, incremental rather than exponential growth could offer significant benefits in terms of testing and developing a long term strategy.

The main obstacle to the development of a long-term self-sustaining market in microgeneration technologies is the high cost of the generation technologies with pay-back times in the worst cases exceeding 100 years[4]. It is the IET's view that with an expanded market and further R&D it might be expected that microgeneration technologies will become significantly cheaper (by about 30-50%) over the next 15 years; however, this may not be adequate in itself to create a mass market. Thus, in terms of cost of energy, microgeneration is unlikley to be competitive with large-scale renewables, and effective energy efficiency measures are always likely to be more cost effective.

Hence, if the potential benefits of particular microgeneration technologies are to be captured, the cost must be reduced by a sustained support framework that:

- Provides simple financial support to build up the market and hence reduce manufacturing costs;
- Provides sustained support for R&D to reduce the cost of generation equipment.

The former suggests a Scottish subsidy strategy will be required for at least the short and medium term. The latter represents an opportunity for Scottish R&D universities and industries.

2. Do you have any views on the key actions covered in the draft strategy summarized in Chapter 8 – Conclusions and Next Steps?

3. The draft Strategy states that we will consider targets to be included in the final strategy and Action Plan:

a) Do you have any views on specific targets referred to within the draft?

---

[3] The importance of correct system design and installation was demonstrated by *The Carbon Trust's Small-Scale CHP field trial update* (November 2005): http://www.carbontrust.co.uk/Publications/publicationdetail.htm?productid=CTC513&metaNoCache=1

[4] DTI Microgeneration Strategy & Low Carbon Buildings Programme: http://www.dti.gov.uk/files/file13989.pdf

b) Are there any other targets which you believe should be considered?

4. Are there any other comments you would like to offer on this strategy in relation to the promotion of energy efficiency and microgeneration in Scotland?

The issues raised in response to Question 1 suggest that in order to strengthen the implementation of the measures put forward in this consultation, the Scottish Executive will need to address the following:

- The need to ensure the availability of a specialized skills base to advise on design, installation, commissioning and maintaining new technologies, and to inspect and monitor the performance of buildings;
- The need for more and stronger incentives for the refurbishment of existing buildings;
- The potential for moving to a "whole building" approach to energy management and monitoring; and
- The need to ensure policy integration with Westminster – energy conservation, energy efficiency and energy services should operate as a continuum, avoiding policy conflicts and mixed messages.

5. If you are responding on behalf of an organisation, how do you think your organisation will/can contribute to the success of the strategy?

The IET acts as an independent and authoritative voice for the profession, and aims to provide policy makers and the public with reliable and factual information on engineering and technology issues first amongst which is energy and the environment. The IET acts as the voice of the profession in matters of public concern, in particular with its responses to public consultations such this by the Scottish Executive.

The IET has in excess of 8,000 members in Scotland; 22% work in the energy sector. The IET encourages its membership to commit to continuous professional development (CPD) which in conjunction with its:
- free public information resources: **http://www.theiet.org/factfiles**;
- journals: **http://www.iee.org/oncomms/sector/power/magazine.cfm**;
- knowledge transfers groups: **http://www.iee.org/oncomms/sector/power/;** and
- national and local events: **http://www.theiet.org/events/calendar/**

aims to ensure its members are fully cognisant of the issues and policies affecting the environment and the drive to cleaner sustainable low carbon energy provision internationally, nationally, and within their own communities.

The IET also strives to help Government inform the public on technological matters through its public events, public information resources, teacher support materials for science and technology lessons, and its Website.

The IET is also instrumental in ensuring safe electrical installation regulations (IEE Wiring Regulations) founded on BS7671. Increasing use of microgeneration will require new regulations and guidance for its safe inclusion in new and upgraded buildings.

----ooo0ooo----