Friends of the Earth Scotland

and the

Association for the Conservation of Energy

Response to the Scottish Building Standards Agency's review of the Building (Scotland) Regulations 2004 – Section 6: energy (incorporating changes to section 3 on heating ventilation and condensation)

Summary

1. We welcome the higher energy efficiency targets and lower CO_2 emissions in the proposed changes (standard 6.1), though we believe these are insufficiently ambitious.

2. We welcome the consideration given in the proposals to low and zero carbon technologies (LZCT) (standard 6.2.2), though we believe the approach taken is fundamentally flawed and will lead to minimal or no carbon savings.

3. We welcome moves to discourage air conditioning through good design (standard 6.6), though we believe this should go further, banning mechanical ventilation except where entirely unavoidable.

4. We welcome the requirement for individual property metering where a district or block-heating scheme exists (standard 6.11), but recommend this be extended to require smart metering, and that this technology be mandatory in *all* new-buildings.

5. We are alarmed that no measures have been incorporated to ensure compliance with building regulations – for example, compulsory air tightness testing, as applies in England and Wales. Evidence suggests that up to a half of newly built houses fail to comply with building regulations. One wonders what the value of setting exacting standards is, if they are not complied with.

6. We are concerned that an elemental approach may not give as accurate a picture of CO_2 emissions and energy performance as a whole-building approach (standard 6.1). However, we understand that a whole building approach creates problems for small builders especially. We therefore recommend that the elemental approach only be made available to low volume builders, and be phased out by 2010, though the setting of minimum standards for each building element must continue.

7. We recommend that Scotland adopt a 'consequential improvement' approach to all major refurbishment or extension, to the extent that 10% of the value of any refurbishment or renovation be invested in improving the energy performance of the existing building

Friends of the Earth Scotland
Lamb's House Burgess Street Edinburgh, EH6 6RD
Tel 0131 554 9977 Fax 0131 554 8656 Email info@foe-scotland.org.uk Website www.foe-scotland.org.uk

8. We welcome the introduction of energy performance certificates in order to comply with the EU Energy Performance of Buildings Directive (standard 6.9). However, we believe it is essential that the methodology used for certification is an established and credible methodology.

9. We are disappointed that a lower thermal efficiency standard applies to conservatories of $20m^2$ or less, compared with higher standards for conservatories over this size. Since the vast majority of domestic conservatories are less than $20m^2$, we believe this is a major missed opportunity to demand higher standards and therefore to reduce CO_2 emissions.

Introduction

Friends of the Earth Scotland is a Scottish charity which works to promote environmental justice. As part of our work we have undertaken research into, and argued for greater investment in measures to tackle fuel poverty and promote energy efficiency, alongside increased investment in Scotland's renewable energy resource.

The Association for the Conservation of Energy is a lobbying, campaigning and policy research organisation, and has worked in the field of energy efficiency since 1981. Our lobbying and campaigning work represents the interests of our membership: major manufacturers and distributors of energy saving equipment in the United Kingdom. Our policy research is funded independently, and is focussed on four key themes: policies and programmes to encourage increased energy efficiency; the environmental benefits of increased energy efficiency; the social impacts of energy use and of investment in energy efficiency measures; and organisational roles in the process of implementing energy efficiency policy.

The comments included in this response reflect the views of both Friends of the Earth Scotland and the Association for the Conservation of Energy.

Specific comments:

1. We welcome the higher energy efficiency targets and lower CO_2 emissions in the proposed changes (standard 6.1), though we believe these are insufficiently ambitious.

Since buildings are responsible for over 40% of our CO_2 emissions, we welcome the explicit statement of purpose for the proposed changes in building regulations:

"The principle aim of the proposals is to reduce the CO_2 emissions that occur as a result of energy usage in heated/cooled new buildings and existing ones that are being converted, altered or extended."[1]

Our concern, however, is that this statement of principle is not carried over into specific guidance. In order to achieve a 60% reduction in CO_2 emissions from buildings by 2050, far higher standards are needed for new buildings, because at least two thirds of the buildings in existence by the target date, will have been constructed to today's or historical standards[2]. Therefore to achieve an average 60% reduction in emissions by 2050, across the whole stock, any newly constructed buildings need to achieve low or zero space heating energy demand by 2020 at the latest[3]. The current proposals are

[1] Annex E, Regulatory Impact Assessment, section 1.1
[2] "40% house", Boardman B et al (2005), University of Oxford, p.5
[3] ibid, p. 38

insufficiently ambitious to achieve this and will therefore hinder the pursuit of meaningful targets for emissions reduction.

As a minimum requirement we specifically suggest the following 'backstop' U-values for specific elements (area-weighted average U-value for all elements of the same type):

Walls	0.3
Floors	0.2
Roofs	0.15
Windows, doors, rooflights, roofwindows	2.0

These values are slightly more onerous than those currently in existence elsewhere in the UK, but are comparable with much of northern continental Europe, and fall some way short of current Swedish standards. They are also the figures recommended as the standard performance for new housing in 2005-2009 under the 40% house scenario[4].

The proposals aim to produce an 18-25% reduction in CO_2 emissions. Again, we believe this to be insufficiently ambitious. The 2003 energy white paper noted that a detached house built to the latest UK standards consumes 20% more energy than an equivalent home in Denmark[5]. Since then, the Danish standards have increased by a further 25%. We therefore believe that only a *minimum* 25% reduction in emissions would be acceptable. The current Northern Ireland proposal for a 40% reduction in emissions from new buildings (admittedly from a poorer start) puts this aim into perspective.

2. We welcome the consideration given in the proposals to low and zero carbon technologies (LZCT) (standard 6.2.2), though we believe the approach taken is fundamentally flawed and will lead to minimal or no carbon savings.

We are highly supportive of measures to encourage the use of LZCT through building regulations. Indeed, in order to implement article 5 of the EU Energy Performance of Buildings Directive, it is essential that LZCT is considered for all new buildings over 1,000m^2 in floor area[6]. LZCT has many advantages, not least the significant contribution it can make to reducing greenhouse gas emissions.

However, we believe the proposed method of 'incentivising' LZCTs through allowing a reduction in wall U-value standards to 0.35 is entirely counter-productive and fundamentally flawed. If the focus of incorporating LZCT is, as stated, "primarily on lowering carbon dioxide emissions from buildings"[7] then the proposed method will almost certainly fail. As we understand, the proposal is that if the difference in CO_2 emissions between a building with LZCT and without LZCT is 10% or more, then U-values in walls may be relaxed. This relaxation will lead to an increase in CO_2 emissions, thus negating the benefit of installing the LZCT in the first place. This zero-sum game renders the incentive meaningless. In addition, given that installing LZCT is likely to add significantly more to the building cost than complying with the slightly more stringent wall U-value standard, it is unlikely that many, if any, developers will install the LZCT. The 'incentive approach' will therefore fail either to promote LZCT or to reduce CO_2 emissions significantly.

[4] "40% house". ibid, p.42
[5] "Our Energy Future – creating a low carbon economy" (2003), DTI
[6] Directive 2002/91/EC http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_001/l_00120030104en00650071.pdf
[7] Consultation documents, Annex B, section 6.0.1

Our preferred method of promoting LZCT technologies is through making them compulsory in all non-domestic buildings over 1,000m^2. This is the approach which has been operating successfully in the London Borough of Merton for three years[8], and which growing numbers of English councils (more than 70 at last count) are now adopting. The Merton policy is phrased as follows:

"All new non-residential developments above a threshold of 1,000 sqm will be expected to incorporate renewable energy production equipment to provide at least 10% of predicted energy requirements."[9]

We believe that the policy should not merely apply to non-residential developments, although it is perhaps prudent to phase the policy in over time, starting with non-residential developments and including residential developments over time. More stringent conditions may also be added over time: for example reducing the size of buildings covered by the clause, or increasing the percentage of on-site renewable energy to 15% or 20%.

The advantages of adopting the 'Merton' approach are two-fold: firstly, the developer has an immediate incentive to incorporate design elements and insulation to lower the overall energy requirements of the building. Secondly, reducing the energy demand also reduces the total amount of energy to be sourced from on-site LZCT, to meet the percentage target; hence there is a greater incentive for energy efficiency over and above minimum standards. This will occur because developers should realise that it will usually be more cost-effective to invest in energy saving measures than in energy generation. Such an approach is not only cost effective but ensures that the 10% of energy produced from LZCT will genuinely add value in terms of reducing overall carbon emissions from the building. The approach proposed in the consultation will not realise any of the intrinsic benefits of the approach already put in place in Merton.

We question why the mandatory method of using percentage targets to promote LZCT is being ruled out in the current proposals. In this respect we are disappointed in statements such as;

"Some of these technologies are not at a mature stage of development and consequently it has not been possible to introduce a mandatory standard as this could stifle innovation and adversely affect the ones that are less mature."[10]

This completely ignores the fact some technologies are, according to the DTI, already cost effective, especially off the gas network, and others will rapidly approach this point during the timeframe for introduction of the new regulations[11]. Given that a percentage target does not promote or favour any particular technology we feel that it will not stifle inovation. It also creates a target market for less mature technologies to seek entry to. The approach being proposed by the Scottish Building Standards Agency will fail in this respect, and quite frankly is not credible as a means of promoting increased market penetration of LZCTs.

We believe that the Scottish Building Standards Agency may be relying on work it commissioned from the Building Research Establishment in 2005 to look at the issue of

[8] http://www.merton.gov.uk/living/planning/plansandprojects/10percentpolicy.htm
[9] ibid
[10] Consultation documents, Annex E, regulatory impact assessment, section 8.2
[11] "Our Energy Challenge: Power from the People", DTI Micro-generation Strategy, 2006

LZCT in Scottish Building Standards[12]. We question and take issue with following conclusions in the BRE report:

- Mandatory LZCT would increase building capital costs significantly
- If a list of technologies is specified, this would disadvantage those technologies not included on the list.
- Financial assistance programmes (for example the Scottish Community and Householder Renewables Initiative) would need to be reviewed and may need to be adjusted.
- LZCT manufacturers and installers may not have the capacity to cope with demand.

We believe it is invalid to decide that LZCT should not be made mandatory for the above reasons on the above grounds because:

- We are not aware of any evidence – and the BRE did not cite any in their report – to suggest that mandatory LZCT would significantly increase the capital cost of buildings. Research conducted by Merton Borough, however, suggests that their mandatory LZCT policy has led to a 3-4% increase in the capital cost of developments[13]. We believe that this is acceptable and consistent with the approach of the Scottish Building Standards Agency, given that the regulatory impact assessment to the current proposals states:

  "Although the cost of building may be increased and such cost is passed on to the owner of the building, this extra cost is recouped (sometimes several times over) throughout the lifetime of the building. This is particularly relevant when viewed in conjunction with the current climate of rising energy costs for both domestic and non-domestic users."[14]

- If including a list of acceptable technologies would disadvantage those technologies not on the list, this suggests that it may be prudent not to specify which technologies are acceptable: this leaves the market to decide. Merton Borough do not specify which technologies are acceptable, and their policy appears to be effective.

- Grant programmes for LZCTs, such as SCHRI, would need to be reviewed were LZCTs to be made mandatory. However, the current building regulations will not enter into force until Spring 2007, giving sufficient time for any review to be undertaken and implemented in good time.

- It should be remembered that adopting an approach similar to Merton would, in the first instance, apply only to selected buildings over a certain space threshold, and not to all buildings. Hence it would limit the initial demand. Any threshold could be tailored to the available capacity if necessary. A very rough per capita calculation applying the Merton standards and rate of installation to Scotland suggests a level of around 135 qualifying developments, comprising around 1000 devices, spread over 3 years[15]. In comparison over the 3 years from 2002 - 2005

[12] "Low and Zero Carbon Technologies in the Scottish Building Standards", Shearer D and Anderson, B (2005) – Building Research Establishment
[13] http://www.merton.gov.uk/living/planning/plansandprojects/10percentpolicy.htm
[14] Consultation documents, Regulatory Impact Assessment, Annex E, para 4.3
[15] Figures from "Our Energy Challenge: Power from the People", DTI Micro-generation Strategy, 2006; Population of Merton Borough from http://www.merton.gov.uk/neighbourhood/areas/census/census2001ward/census2001-demographics.htm; Scotland population from http://www.statistics.gov.uk/census2001/pyramids/pages/179.asp

the Scottish Community and Householder Renewables Initiative has supported approximately 524 projects[16]. We are not aware of any evidence to suggest that LZCT manufacturers or installers do not have sufficient capacity to cope with this type of increase in demand that a mandatory LZCT policy would create. In this respect BRE did not present any evidence in their report concerning increases in demand and comparable manufacturing capacity. In this respect we note that the number of LZCT manufacturers and installers in Scotland alone has exploded from 7 in 2003 to 43 today[17]. In addition, a study conducted by the Energy Saving Trust into the potential for micro-generation in the UK found no lack of capacity in the industry, and specifically supported the insertion of a requirement for some LZCT use in building regulations[18]. Furthermore, if capacity is genuinely an issue then the scope for a delayed application of this part of the regulations should be investigated.

3. **We welcome moves to discourage air conditioning through good design (standard 6.6), though we believe this should go further, banning mechanical ventilation except where entirely unavoidable.**

We warmly welcome this proposal, which will have the positive side-effect of further reducing CO_2 emissions from buildings. However, we believe this should go further, in explicitly ruling out the use of mechanical cooling or ventilation unless it is entirely unavoidable.

4. **We welcome the requirement for individual property metering where a district or block-heating scheme exists (standard 6.11), but recommend this be extended to require smart metering, and that this technology be mandatory in *all* new-buildings.**

In order to create an incentive for residents to monitor and reduce their fuel use, they must be made aware of how much fuel they currently use. This proposal helps to do that, and is therefore welcome. However, we believe building regulations must go further, and require the installation of 'smart' meters in all new or refurbished domestic buildings. 'Smart' meters, which are capable of displaying consumption costs and being read remotely, can help in delivering carbon and fuel poverty targets through reducing energy usage.

A report by energywatch[19] suggests that smart meters can lead to a reduction of between 3% and 15% in energy use, through changed consumer behavior. Although the capital cost of smart meters is currently higher than standard meters, with economies of scale these costs are likely to drop significantly. In addition, the presence of a smart meter facilitates the inclusion of LZCT, or of later retrofitting of LZCT.

5. **We are alarmed that no measures have been incorporated to ensure compliance with building regulations – for example, compulsory air tightness testing, as applies in England and Wales. Evidence elsewhere in the UK suggests that up to a half of newly built houses fail to comply with building regulations. One wonders what the value of setting exacting standards is, if they are not complied with.**

Studies conducted in England and Wales suggest that compliance with the air-tightness part of building regulations is as low as 68% overall, and considerably lower (57%) in

[16] Personal communication with the manager of the SCHRI programme, May 2006
[17] Personal communication with the manager of the SCHRI programme, May 2006
[18] "Potential for Microgeneration – Study and Analysis", November 2005, Energy Saving Trust
[19] "Get Smart – bringing meters into the 21st Century", (2005) Energywatch

houses[20]. Anecdotal evidence suggests that complaince in Scotland may be lower still. Anecdotal evidence also strongly suggests that, since builders rarely follow architect's and designer's instructions to the letter, compliance with building regulations may vary enormously between the building design and the actual building, as built on the ground.

Building regulations are unlikely to deliver their intended CO_2 emissions reductions unless the regulations are complied with. We are disappointed that the SBSA has not undertaken any formal research into compliance with building regulations in Scotland in buildings as they are built. However, as a minimum approach to ensuring compliance, we believe that compulsory pressure testing must be introduced in the current review, to bring Scotland up to the level that currently exists in England and Wales.

Following publication of research in England and Wales on complaince, a major briefing programme of building control officers (BCOs) has been undertaken, which has so far reached one in four BCOs. Research is now being commissioned into both the qualitative and quantitive compliance with building regulations in England and Wales. We are very disappointed that the Scottish Building Standards Agency have failed to follow the lead of their colleagues south of the border, and are so far failing to address the issue of non-compliance.

In the words of the leading academic study on reducing emissions from buildings, the 40% house study,

"Compliance with Building Regulations needs to be improved if claimed carbon savings from homes are to have any basis in fact. Very few studies are conducted on the performance of buildings in use, but these few suggest that standards are frequently not being met."[21]

6. **We are concerned that the elemental approach outlined in section 6.1 may not give as accurate a picture of CO_2 emissions and energy performance as a whole-building approach. However, we understand that a whole building approach creates problems for small builders especially. We therefore recommend that the elemental approach only be made applicable to low volume builders, and be phased out by 2010, though the setting of minimum standards for each building element must continue.**

Adopting an elemental approach on the one hand offers a pragmatic solution for builders lacking the resources to convert to a whole building approach. On the other, it heightens the risk that new buildings may not conform to the whole-building approach if it were applied, and equally importantly, it denies builders the opportunity to improve and institutionalise their understanding of energy processes in buildings. We therefore recommend that the elemental approach be made available only to low-volume builders, and be phased out by 2010.

However, we believe it essential that the minimum 'backstop' U-value standards for each building element continue to be set, to ensure that high standards are maintained.

7. **We recommend that Scotland adopt a 'consequential improvement' approach to all major refurbishment or extension, to the extent that 10% of the value of any refurbishment or renovation be invested in improving the energy performance of the existing building**

[20] "Assessment of energy efficiency impact of Building Regulations compliance", Brown M (2004), Building Research Establishment
[21] "40% house", ibid, p.45

If a building is being extended, then however efficient that extension, the overall energy consumption of the building as a whole – and hence carbon emissions – will inevitably increase: in other words, the carbon footprint of the building will be larger. To address this, the concept of 'consequential improvements' requiring energy efficiency improvements to the original building simultaneously to the extension should be adopted.

This proposal formed part of the 2004 part L consultation exercise in England and Wales – receiving overwhelming endorsement from respondees – and is now being actively considered by ministers in Westminster under an intergovernmental task group on improving energy use in existing buildings. It would in our view be most regrettable if, once again, Scotland were to lag behind England in this regard.

It is, in our view, vital that the energy efficiency of existing stock as well as new building stock be considered in building regulations. As the University of Oxford '40% house' project made abundantly clear, we will not achieve a 60% reduction in emissions from buildings unless both existing and new buildings are addressed. Indeed, the report refers to consequential improvement as, "...a welcome first step, but its impact will be insufficient if it only covers those measures which are cost effective today. The 40% house scenario represents a massive level of improvement to the existing housing stock, as well as an accelerated programme of stock replacement."[22]

8. We welcome the introduction of energy performance certificates in order to comply with the EU Energy Performance of Buildings Directive (standard 6.9). However, we believe it is essential that the methodology used for certification is an established and credible methodology.

Both NHER and SAP (or variations of SAP) are recognised, established and credible methodologies for measuring the energy performance of a building. These methodologies are already in use throughout the UK, and either methodology would comply with the EU Energy Performance of Buildings Directive.

We have grave concerns, from the limited information available, about SBSA's proposals for the Scottish Energy Rating Tool (SERT). Firstly, since SERT appears to rely on the householder to complete information about their home, there will be a need for independent assessment of each home by an independent expert – probably a local authority building control officer – in order to comply with the directive. We have severe doubts that local authorities have sufficient resources in order to undertake this work.

Secondly, from the limited information available about SERT, it appears to be an extremely simplified tool using very limited data. Concerns have been expressed by those in the industry as to whether the output from such a tool can be relied upon. Again, we feel this is unlikely to comply with the directive.

9. We are disappointed that a lower thermal efficiency standard applies to conservatories of 20m^2 or less as applies to those over this size (standard 6.2.9). Since the vast majority of domestic conservatories are less than 20m^2, we believe this is a major missed opportunity to demand higher standards and therefore to reduce CO_2 emissions.

We fail to see the logic in setting two different U-value standards for glass in conservatories: one for those larger than 20m^2 and one for those smaller. We believe this to be a missed opportunity to demand a high standard throughout, thereby reducing

[22] "40% house", ibid, p.45

CO_2 emissions. A consistent approach should be used, and a maximum U-value of 2.2 (area-weighted average U-value for all elements of the same type) should be set for all conservatories, regardless of size.

Conclusion

We trust that you will take our views into account in finalising the new regulations, which we await with anticipation.

25 May 2006

Chas Booth
Parliamentary Officer
Friends of the Earth Scotland and the Association for the Conservation of Energy
cbooth(at)foe-scotland.org.uk