

Sustainable Buildings Division
Zone 5/G10
Department for Communities & Local Government
Eland House
Bressenden Place
London SW1E 5DU

Ref: Zero Carbon Consultation Response -
Feb2010.docx

26 February 2010

Dear Sir / Madam

Zero Carbon for new non-domestic buildings – consultation on policy options Cundall response

Thank you for the opportunity to respond to the consultation on this policy. Cundall is an engineering design consultancy with a strong focus on delivering low energy buildings.

We support the implementation of legislation to deliver new zero carbon non-domestic buildings by 2019 provided:

1. The actual energy performance of all new and existing non-domestic buildings is publically reported and made easily accessible on a web-based database – the current secrecy of DEC and EPC ratings will not change behaviour in the property industry. Design intent is not the same as reality.
2. There is separation between landlord/building owner energy consumption and tenant energy consumption, with requirements for new fitouts to also be low or zero carbon. This separation has existed in the Australian NABERS rating scheme since the 1990's. Tenancy requirements should include a combined area (kWh/m²) and occupancy (kWh/person) benchmarks to reflect how efficiently the space is being used.
3. A simple and transparent mechanism for investment in off-site renewable energy sources is implemented as it is physically impossible (and often financially prohibitive) to generate sufficient electric and heating energy on-site on most non-domestic buildings.
4. A plan for future legislation is also developed to improve the energy performance of existing building stock to reduce the increasing energy gap between new and existing building energy consumption. If over 80% of non-domestic buildings in use in the UK in 2050 are constructed prior to the zero carbon legislation in 2019, and the cost of complying with zero-carbon makes new build less financially attractive than running old, inefficient buildings, then the legislation will have limited impact on the UK's overall emissions.
5. Local planning authorities do not have the power to arbitrarily apply minimum on-site renewable targets on new buildings (e.g. 10% merton rule). The industry needs consistency across the country.

We provide the following detailed responses to the questions and issues raised in your consultation document dated November 2009.

Chapter 1: Introduction & Principles

We provide the following comments on the principles set out in this chapter:

- To reduce energy consumption in buildings it is imperative that people's behaviour and expectations are also changed – relying on design and technology alone is not sufficient. Issues that need to be addressed include sensible lighting levels (both landlord installed and tenant installed) and temperature setpoints.
- Display Energy Certificates should be made mandatory for all non-domestic buildings greater than 1000m² from 1 January 2011, and for buildings greater than 500m² from 1 January 2012.
- Landlord energy and tenant energy must be separated to avoid split incentives. Legislation should apply to those issues which each party has direct control – landlords (e.g. building fabric, central services, installed lighting) and tenants (lighting, small power and supplementary HVAC systems)
- It is not necessary to adopt the same approach for non-domestic buildings as that proposed for zero carbon homes. These building types are very different (they have their own Part L regulations) and trying to reconcile the two could lead to counter productive outcomes.

Chapter 2: Energy Efficiency

1. *Do consultees agree that we should establish challenging energy efficiency standards for non-domestic buildings covering space heating and measured on a kWh/m²/year basis?*
 - We agree to using kWh/m²/year to establish minimum energy efficiency standard for each building type for landlord / building owner / developer delivered space heating and cooling
 - The energy target must include all installed energy consuming items such as lighting, lifts and ventilation systems (e.g. car park vent) and not be limited to heating and cooling (which can be a small component of energy in many non-domestic buildings)
 - Targets should be adjusted for buildings delivered as “shell and core” – ie where floor fitout of lighting and mechanical systems are by the tenants
 - Tenancy fitout must also have an energy target if lighting and supplementary air conditioning are installed at a later date by tenants.

Chapter 3: Balancing on-site & off-site measures

2. Which of the scenarios would you favour as a basis for setting on-site aggregate targets?

- Off-site rich solutions is the only viable way of delivering zero carbon non-domestic buildings. While heat can be generated on site using a variety of reasonably cost effective renewable systems (e.g. solar hot water, biomass, heat pumps) this often accounts for less than 20% of total energy in new non-domestic buildings. As building fabric improves the heating proportion reduces further.
- Non-domestic buildings typically have less potential for on-site renewables (less roof space per person). For example, only single storey non-domestic buildings are likely to have a sufficient roof area for photovoltaics to make a meaningful contribution (ignoring prohibitive cost issues and 20 year payback with feed-in tariffs)
- There are three methods of generating renewable electricity on site but in most cases these will not be technically viable in urban environments (where the majority of non-domestic buildings are located). For example, to offset the electricity consumption of a highly efficient office building in an urban setting using on-site renewables has the following challenges (ignoring cost effectiveness and return on investment issues):
 - **Photovoltaics** – typically requires an area of panel significantly larger than the roof area available (0.5m² of panel for every 1m² of net lettable area)
 - **Wind** – typically requires a wind turbine diameter greater than the height of the building which is clearly impractical
 - **Biomass CHP** – space and biomass delivery constraints, air quality issues (e.g. banned in Edinburgh), needs to be at least 1MW to be viable, must have useful use of heat all year round to be effective, not supported by Feed-in tariffs in 2010
 - **All the above** – does the electricity infrastructure have the capacity to have electricity fed back into the grid (often not possible due to aging sub-stations and reduced fault levels)
- Perhaps the trigger for off-site v on-site could be based on a three step process:
 - Planning: Will council permit the use of wind turbines, biomass, etc of the size required to become zero carbon
 - Technical: Are systems that council allows able to be physically installed on the site (ie is there sufficient space for the PV panels, wind turbine, etc)
 - Payback: Will the system payback in less than 15 years? If no, then off-site solutions should be adopted for the energy not able to be supplied on site

3. What views do you have on the impact of costs of building to zero carbon standards in different sectors? How and why does sensitivity to new build costs differ between sectors?

- Different sectors have varying energy intensities (e.g. kWh/m² for a storage shed is very different to a hospital), complexity of building systems and differing mixes of high grade energy (electricity) and low grade energy (heating). The costs to achieve zero carbon will therefore vary significantly between the sectors. Producing renewable heat on-site has a much lower capital cost than producing renewable electricity on-site.

Chapter 4: off-site measures – form & timing

4. *Do you agree that we should adopt the same measures and approaches for allowable solutions for non-domestic buildings as those for homes?*
- NO. Homes and non-domestic buildings are very different. The list of allowable solutions in 4.4 is specific to homes.
 - Energy efficient appliances form a very small component of energy in non-domestic buildings.
 - Most non-domestic buildings already have advanced building control systems – these are often complex and don't necessarily lead to energy savings in operation.
 - Be wary of using local authorities in shaping developer's choices about allowable solutions. They are generally inconsistent across the country (e.g. % renewable targets, banning biomass, etc) and the industry needs certainty. Also, most local authorities do not have the technical expertise to provide this advice.
5. *Are there any extra allowable solutions that should be used specifically for non-domestic buildings?*
- Export of low carbon or renewable heat from the development to other buildings
 - Investment in low and zero carbon community heat infrastructure
 - Investment in off-site renewable energy generation (e.g. wind farms) through a simple government funding arrangement – ie developers pay for someone else to build large scale renewable energy plant off-site rather than installing inefficient systems on site without any economies of scale.
 - Establish a government accredited new green power scheme (similar to system in Australia www.greenpower.gov.au) which is over and above any mandatory ROCs requirements. Green tariffs are typically 50% higher than standard tariffs and encourage investment in large scale renewable energy. The developer/owner then signs a commitment (which stays with whoever buys/leases the building) to purchase accredited new green power for a minimum of 20 years. This does not restrict choice as all electricity retailers can partake in the scheme.
6. *Do you agree with the proposal to introduce an element of allowable solutions for non-domestic buildings at 2016? What views do you have on the level at which this should be set, and the impact this will have?*
- YES. After meeting energy efficiency (kWh) standards then set requirement for 25% of CO₂e emissions (not energy) to be met using either on-site or off-site renewable (zero carbon) energy generation systems. This does require clear mechanisms to be in place for off-site energy investment to be established by government prior to then.

Chapter 5: Defining the Zero Carbon destination

7. *Do you favour an approach of setting a flat rate requirement above 100% regulated emissions to account for unregulated emissions?*

- NO. Most unregulated energy is “small power” which means the equipment (computers, servers, etc) that building occupiers plug in. This will vary significantly across different buildings and building types (e.g. supermarket v data centre v factory v office). Trying to establish a notional percentage increase on regulated power is complete nonsense.
- Adopt the “polluter pays” principle. Unregulated power should be dealt with differently as it is often outside of the control of the developer / building owner. This should be coupled with a requirement for metering of tenant’s light and power energy consumption.
- Equipment can be dealt with by increasing equipment energy efficiency standards in the UK.
- As discussed above, imposing energy standards on the fitout of buildings should also be considered as this can account for over 50% of the total energy consumption of commercial buildings. The building owner can choose to provide a contribution to the unregulated power and use this as an incentive to attract tenants to help them achieve the tenant fitout energy standards.
- Make it mandatory for tenants to report annual energy consumption (with this displayed next to DEC certificate in foyer of building).

8. *Would you favour the 10% allowance, the 20% allowance or another rate?*

- 0% - refer comments above.
- If no metering of unregulated power per floor / tenant is provided then a 20% allowance should apply – this will always be much more expensive than metering and so will lead to metering being installed. We need to change people’s behaviour in buildings – a flat rate allowance does not change behaviour, energy meters and direct charging for energy use will.

Chapter 6: Zero carbon for new public sector buildings

9. *Do you agree with the overall work programme we have outlined for the public sector?*

- Don’t know – wasn’t clear.

10. *Are there other ways in which the public sector could usefully provide leadership for the move to zero carbon?*

- Provide case studies that are relevant to the majority of the non-domestic building sector. Examples like Lion House, while interesting and laudable, are miniscule compared to total public sector consumption and cannot be replicated for 99% of non-domestic buildings (ie they are not small buildings located in open spaces).

- Put all public sector DEC ratings on a public database and stop hiding actual performance.

11. *Do you agree that the public sector should start trialling allowable solutions from 2015?*

- YES – to iron out the problems / glitches before rolling out to the private sector.

12. *What role(s) do you think local government can play in contributing to public sector leadership on zero carbon buildings?*

- Show how existing buildings can be improved by one to two ratings (typical DEC rating is D/E).
- Focus exemplar projects on those building types and locations that have the biggest contribution. No point in showing what can be done in an open plan office in an empty field with limited constraints – how do we deliver zero carbon in large buildings in our cities, how do we achieve zero carbon hospitals, prisons, etc?
- Government can't show leadership if it doesn't report actual performance. Low carbon design is just a statement of good intentions – its actual operation that emits greenhouse gases. It is essential to make the Display Energy Certificate register publicly available and searchable. This can currently only be accessed by an FOI request at a cost of over £2000.

Chapter 7: Delivery and next steps

13. *Does this package of measures and proposals for next steps address the key delivery issues to make progress towards the zero carbon emissions? If not, what action is needed and by whom?*

- Focus on the biggest sectors and buildings (e.g. offices, hotels, supermarkets) and omit small scale buildings for first couple of years (e.g. petrol filling stations, 100m² office, etc). Tackle those building sectors which can have a big impact on the national greenhouse gas emissions – leave the smaller sectors to a later date when design/assessor skill levels and resources have increased.
- Close all the loopholes in SBEM software to stop consultants exploiting the rules (e.g. putting daylight sensors deep inside buildings to improve the EPC rating – these will not reduce actual energy).
- Provide a resource of competent people who can answer technical questions regarding application of legislation. Local Authority Building Control officers are currently struggling to keep up with the rapidly changing and increasingly technical legislative requirements and so either further training is required or an audited “competent persons” scheme should be adopted.
- Make Display Energy Certificates mandatory for all non-domestic building > 500m². Actual reporting of energy consumption in all buildings is the only way that progress can be measured and behaviours changed. It will also inform whether the zero carbon legislation is working in practice.
- BREEAM is a voluntary rating tool to help developers / building owners differentiate their product in the market. For many building types bespoke versions need to be developed. In comparison, houses

are relatively simple and straightforward to assess. Keep legislation to things that are clearly measurable.

We trust you will find our comments above constructive. Please contact me if you would like to discuss any of the issues raised.

Yours sincerely
For and on behalf of
Cundall Johnston & Partners LLP

A handwritten signature in black ink, appearing to be 'D. Clark', written in a cursive style.

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