

Call for evidence on SUSTAINABLE CONSTRUCTION AND THE GREEN DEAL

Submission by Lime Technology Ltd & Lhoist UK Ltd for consideration by the All-Party Group for Excellence in the Built Environment

About Us

Lime Technology Ltd and Lhoist UK Ltd work together in providing the construction industry with sustainable construction solutions based on breathable building fabric; focused on bio-renewable and lime bound products.

Lime Technology Ltd. is an SME providing a range of sustainable construction products, manufacturing and distributing binders and breathable EWI solutions. A contracting business subsidiary provides specialist capability in construction with bio-renewable and lime bound products. Through another subsidiary, Hemp Technology Ltd., the business owns and operates Europe's largest natural fibre crop processing facility, principally producing natural fibres for the automotive and construction industry but also producing bio-based aggregate chips for the animal husbandry and construction sectors.

Lhoist UK Ltd is the British business of the Belgian owned Lhoist Group. Lhoist is the world's largest international industrial mineral lime manufacturing business. A production base in Derbyshire produces high purity industrial mineral lime products with approximately 1/3rd of specialist production being exported worldwide including mainland Europe, India, South America and Asia. Lhoist UK Ltd. serves a wide range of UK markets including environment, chemicals, water, construction, civil engineering, agriculture, paper and metallurgy industries. Lhoist UK is a member of MPA.

Introduction

The Commission's call for evidence provides a much needed opportunity to identify key barriers to delivery of successful, truly sustainable and long term solutions for the construction sector. Hopefully the topics noted within our submission can shine a bright light on some aspects of what is preventing the UK from understanding and implementing learning from experience and recent progress in understanding of building physics. We have included appendices of recent exemplar new build projects, ranging from sustainable house building to the delivery of Blue Chip Plan A commercial & retail solutions.

Additionally we hope that the same topics can be reflected on for the Green Deal and implementing learning from previous mistakes in the UK and elsewhere. For example in the USA, where condensation problems in a significant number of American buildings, with the associated indoor air quality and public health issues, came as a direct consequence of the selection of solutions that trapped moisture and accelerated mould growth, as well as causing fabric deterioration.

1. Evidence of best practice

Included in the appendices are case studies of recent sustainable build construction projects. More case studies are available on the Lime Technology website www.limetechology.co.uk The technology has been in use in mainland Europe for more than 15 years and projects have also been completed in the USA and Australia.

We believe that the projects which have been included here are projects that can be readily repeated. There are clearly enlightened customers who have seen their commitment through and helped to overcome the many barriers to sustainable construction. Their journeys have all been different and all of them required a significant investment of our resources to facilitate their success.

Marks & Spencer

- Manufacture of 2600m² of Hemclad® panels
- 100% FSC chain of custody
- U-value of 0.12W/m2.K
- 80T of CO2 locked up
- 340T of CO2 saved
- Project completed on time and on budget

Passiv Haus

- Brick (& lime mortar) faced private house
- Passive Haus specification
- U-value Walls – 0.11W/m2.K ;
- U-value Roof – 0.1 W/m2.K
- Air-tightness – 0.6 air changes per hour
- Built using Hembuild® system

There is also a house built on the BRE Innovation Park, The Renewable House that set the standard in 2009 for fabric first, bio-renewable construction of affordable, sustainable mass market housing. The website www.renewable-house.co.uk contains lots of information about the project. Developments in the three years since then mean that an even better solution is readily available now for the housing market.

The technical challenge of rapid construction for the mass market has been overcome by development of a factory produced, offsite system, producing ready-to-erect panels, both structural and non-structural, that provide a highly sustainable housing solution. The panel systems provide a carbon sink at the point of construction, reducing emissions through the carbon sequestration of the plant material used. The high thermal performance and buffering of humidity and temperature provided by the products involved, delivers a long term low energy consumption and low carbon emissions solution. The panels are a British invention using a majority of UK produced raw materials.

2. Barriers to Sustainable Construction

Short termism and funding issues – we need to develop financial models for the funding of our buildings that are based on whole life cost and ultimate asset value. The current financial models being so separated between the capital expenditure and the ongoing running and maintenance costs, means that there is a transfer of responsibilities that is largely misunderstood, ignored and ultimately uncontrolled.

Mortgages delivering sustainability – we need more mortgage companies to offer reduced interest rates for sustainable construction, like The Ecology Building Society where it is possible to get up to a 1% discount on the mortgage rate by hitting the highest performance standards. Whilst the technical evidence is available to be discovered and understood, it is recognised that providing financial incentives or penalties is clearly how the mass market can be encouraged to change.

Warrantees – The warrantee providers are extremely reluctant to offer warrantees on innovative forms of construction. We need a Government backed warranty scheme to deliver sustainable housing on mass. The recognition in the Stern Review that change is essential and business as usual is not an option, means that there is increased risk involved through change. It is clearly commercially difficult for the supply chain to absorb the increased risk. This has to be the role of Government to provide tangible support for the change that it has recognised has to take place.

Fabric First Approach – Much greater emphasis must be placed on getting the building fabric right (which lasts for the building lifetime) and less emphasis must be given to the renewable power technologies which are quickly out of date and have significant ongoing maintenance and subsequent renewal or updating investment requirements.

The explosion of bolt on equipment and systems that has taken place in recent years has really only provided short term, stop gap type solutions. Climate change is a permanent issue which will be faced by the current and all future generations. Permanent solutions need to be given the support to be the next explosion of choice.

Joined up thinking – we need to link the cost of construction to the cost of running buildings. At present the majority of builders have no vested interest (or penalty) in the on-going energy use. The disconnect that is too often present between the business that will construct or refurbish buildings and the longer term use of the building, so often not by the ultimate owner of the property, prevents the financial responsibility for specification and performance being transferred adequately through the supply chain.

Results based evidence – more buildings need to be tested and monitored to determine real energy use. There is a massive gap between design/modelling based assessments and real life performance. Industry standard approaches have historically taken the simplest, lowest common denominator approach to thermal and energy performance assessment.

By using a static performance indicator of thermal conductivity, measured in a laboratory setting, to provide the basis of the decision making tools for selection of products that operate in a dynamic natural setting, the actual performance is markedly different. This continues to mislead the majority of industry and the supply chain to perceive that a simplistic measurement can inform about a complex system.

Reducing the gap between design assessment and actual performance requires significant effort to remodel how the design process is carried out and similarly significant effort to ensure the delivery of actual performance on site and during the life of the building.

Embodied carbon should be measured and included in assessment methodologies – it is immediate and reductions achieved by using cellulose (timber or crop based) materials will be at least as important as reductions in operational carbon emissions. It is now possible to have the best of both worlds by creating hemp based buildings with low operational emissions and low carbon footprints.

The sequestration of carbon in the growing of the hemp plant locks carbon from the atmosphere into the plant material. The plant material processing does not release the carbon and it is then locked into the building fabric with a binder. The carbon can remain locked in the product even after demolition of the building as it can be recycled and re-used to construct another building, just by adding more binder.

The binder production process does have carbon emissions. However, the ratios between the quantities of binder and the plant material are such that the carbon sequestration is greater than the emissions. This makes the hemp lime product a carbon sink, capturing and locking up more carbon than is emitted in its production.

3. Progress on Sustainable Homes

It can be seen from the content above that the progress on Sustainable Homes is not seen by us as “too much too fast”. On the contrary, it is seen as not enough and not quickly enough.

Weak legislation – Code 6 energy targets could be higher. Passiv Haus standards are 2.5 to 3 times better. The Code for Sustainable Homes and the progressive increasing of requirements is a good plan. However, the evidence shows that higher target standards are appropriate and achievable. What has been seen is a softening of the targets over time.

It is recognised that the challenge has been for the incumbent industry to deliver rapid change in a volume market with the backdrop of the financial crisis. The opportunity is ripe for the higher performing solutions to be proactively supported by Government policy and legislation, so that they can grow as the market recovers and they can displace the outdated, underperforming technologies.

4. Green Deal

Is the policy the right one? There is clearly an urgent need to address the existing building stock to help the UK avoid energy poverty, reduce emissions and provide a standard of living space that is appropriate to the development level of our country. A policy that drives hard to achieve the necessary changes and investment while providing a support structure for the change and investment is more likely to be the right policy than one that does not provide support.

Breathability – a word of caution. The rush to upgrade so many existing buildings will inevitably mean using standard (non-breathable) solutions for non-standard buildings. This is likely to store up moisture problems, building decay issues and affect human health. Taking full account of breathability and how moisture, not water, but water vapour in the air, is managed is going to be a key to successful Green Deal outcomes.

What can be done to ensure take up? Getting the details right and focussing on the preparation phase to ensure that the delivery phase is successful. The Olympic and Paralympic Games project success came about because of an admirable attention to detail in the preparation, that meant delivery appeared smooth and effortless. Having the same uncompromising focus on planning how to deliver a high degree of take up, should result in a successful outcome.

Conclusions

The positive lessons learned for new build and refurbishment must be taken up with commitment and pace, well supported by Government, if the UK is to capitalise on its innovation, skills, expertise and the wider experience.

There is a real need to recognise that the understanding of building physics has moved on significantly faster in recent years than the construction industry regulations and the majority of the supply chain has realized.

This means that a paradigm shift has to occur in both new build and refurbishment.

The Building Regs and the Green Deal need to be urgently revisited to ensure delivery of sustainability and carbon emission reduction with less risk of triggering an epidemic of public health issues and a legacy of accelerated building fabric deterioration, through a lack of understanding how moisture in buildings needs to be addressed.

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