Tom Woolley Rachel Bevan Architects/ASBP

Regional Conference on the Economic Benefits of Energy Efficient Building October 17 2013

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About NEES

The NEES Project is a Partnership Project funded by the Northern Periphery Programme (EC). The Lead Partner is the Cork Centre for Architectural Education and other partners include Glasgow Caledonian University in Scotland, Umea University in Sweden, the Arctic Technology Centre in Greenland and South Kerry Development Partnership, Claremorris Irish Centre for Housing and Northside Enterprise Centre in Cork.



Netural-Energy Efficient-Sustainab

We need to put much more emphasis on Sustainable Materials

We need to reduce the consumption of fossil fuel resources by reducing embodied energy. (not the TV!) Saving energy NOW is more important than saving it in 25 or 50 years time





18 September 2011 Last updated at 08:59

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China: Villagers protest at Zhejiang solar panel plant

Hundreds of villagers in eastern China have held three days of protests at a solar panel plant over pollution fears.

Around 500 people started gathering at Zhejiang Jinko Solar company in Haining city, Zhejiang province, on Thursday.

Some of protesters stormed the factory, overturning several company cars and destroying offices, officials said.



Riot police were brought in to remove protesters from outside the solar panel factory in Haining City

Residents in the nearby village of Hongxiao said they became concerned after the deaths of a large number of river fish.

h. Related Stories

renewable energy has a role to play but it makes a much smaller contribution to reducing CO2 emissions



Example of embedded energy

An investment of 100.000 Euros...

- ..in a photovoltaic panel would save 75 tonnes of CO2 over 30 years
- ..in low carbon concrete would save 663 tonnes of CO2 immediately

Which investment will be made?

Josefina Lindblom Sustainable Production and Consumption Directorate General for Environment

Cement production contributes between 5%-8% of total CO2 emissions globally Each cubic metre of concrete used creates at least 0.37 tonnes of CO2 emissions. The world uses 10 billion tonnes of concrete each year, the most commonly used resource after water.

the embodied energy in one brick building

is equivalent to 32,000 litres of gasoline





Even manufacturing insulation (from petrochemicals) emits as much CO2 as a coal fired power station



Money Isn't All You're Saving

Great claims are made for the performance of synthetic insulation materials but do they work as well in practice?

Embodied Energy - The Carbon Spike

Recently published research in Finland has show that, when all measures are taken into account, the initial energy expended during construction and renovation has a higher environmental impact than the energy used during the life of a building

For this reason we need to use lower impact, low embodied energy materials, construction methods and energy systems Sustainability 2011, 3, 1170-1189; doi:10.3390/su3081170

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Article

A Longitudinal Study on the Carbon Emissions of a New Residential Development

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Abstract: Buildings account for nearly 50% of all greenhouse gases globally. While this has been widely recognized, the GHG mitigation strategies have traditionally concentrated



Making better specification choices can hugely reduce embodied energy (thanks to Sturgis)







This guide to the designs, technologies and materials that really make green buildings work will help architects, specifiers and clients make informed choices, based on reliable technical information.

Low Impact Building: housing using renewable materials is about changing the way we build houses to reduce their 'carbon' footprint and to minimise environmental damage. One of the ways this can be done is by reducing the energy and environmental impact of the materials and resources used to construct buildings by choosing alternative products and systems. In particular, we need to recognise the potential for using natural and renewable construction materials as a way to reduce both carbon emissions but also build in a more benign and healthy way. This book is an account of some attempts to introduce this into mainstream house construction and the problems and obstacles that need to be overcome to gain wider acceptance of genuinely environmental construction methods.

The book explores the nature of renewable materials in depth: where do they come from, what are they made of and how do they get into the construction supply chain? The difference between artisan and self-build materials like earth and straw, and more highly processed and manufactured products such as wood fibre insulation boards is explored.

The author then gives an account of the Renewable House Programme in the UK explaining how it came about and how it was funded and managed by Government agencies. He analyses 12 case studies of projects from the Programme, setting out the design and methods of construction, buildability, environmental assessment tools used in the design, performance in terms of energy, air tightness, carbon footprint and post-occupancy issues.

The policy context of energy and sustainability in the UK, Europe and the rest of the world is subjected to a critical examination to show how this affects the use of natural and renewable materials in the market for insulation and other construction materials. The debate over energy usage and embodied energy is discussed, as this is central to the reason why even many environmentally progressive people ignore the case for natural and renewable materials.

The book offers a discussion of building physics and science, considering energy performance, moisture, durability, health and similar issues. A critical evaluation of assessment, accreditation and labelling of materials and green buildings is central to this as well as a review of some of the key research in the field.

The author

Tom Woolley is an architect and educator and self-builder. He has taught at the Architectural Association, Strathclyde University, Hull School of Architecture, Queens University Belfast, University of Central Lancashire, UITM in Malaysia, University of Umea, the Centre for Alternative Technology in Wales, University of Bath and University of Gloucestershire, His research work and writing has covered housing policy, sustainable materials and design theory. He is active in the Co-operative party, ARC-PEACE and Scientists for Global Responsibility. He has helped to establish the Alliance for Sustainable Building Products in the UK. Working with Rachel Bevan Architects in County Down in Northern Ireland, he is also involved in organic gardening and sustainable woolland management.



LOW IMPACT BUILDING

Housing using Renewable Materials Tom Woolley



We have to find ways of building with much lower impact methods and materials if we want to reduce CO2 emissions and global warming

LOW IMPACT BUILDING

Getting this argument across is not easy

All Party Group for Excellence in the Built Environment



HOUSE OF COMMONS LONDON SW1A 0AA

Re-energising the green agenda

Report from the Commission of Inquiry into Sustainable Construction and the Green Deal



"Greening the built environment provides a huge opportunity to drive growth, skill up a new generation of young people and harness UK expertise to expand exports. All these benefits are apparent to the Government, as it sets out in its recently published Industrial Strategy for Construction."

October 2013

APPG for EBE Inquiry into Sustainable Construction and the Green Deal "The NEXT BIG THING reducing embodied energy"

Box G

The next big thing – reducing embodied energy

As energy in use becomes lower over a building's lifetime, the embodied energy of the building takes on greater significance. According to the Institute of Structural Engineers the embodied energy of products could be 40% of the lifetime energy use of a new building.

Sarah Kaethner from the Institution of Structural Engineers (IstructE) told us:

- The contribution of industry (including construction) is around 35% to global CO₂ emissions, of which 25% are from steel production and 19% are from cement production. The construction industry consumes all the cement and nearly half the steel.
- It is estimated that cement/clinker production alone accounts for around 5% of manmade global greenhouse gas emissions.
- The reductions (50% reduction needed in the next 40 years) will only be met by reducing the impacts of materials in construction significantly.

She further said that the focus attention needs to encompass both retrofit of existing buildings and reduction of carbon dioxide emissions from use of construction materials, which will be challenging. There is a lack of financial incentives and much complexity of the supply chain. The IstructE would like to see targets develop beyond avoiding landfill and achieving high recycled content. Strengthened initiatives are needed for consideration of end of life during initial design and procurement. That may mean dismantling and reuse for schools and hospitals.

One barrier which is often quoted is the difficulty in assessing the CO₂ footprint of materials. This is being overcome by standardisation and the Institution strongly recommends that Government is at the forefront of providing incentives for these standards to be adopted and developed in practice. It is also urging the Government to publish a transitional plan and timescale for the inclusion of consideration of material impacts into Building Regulations. This is necessary in order for the material supply industry and construction industry to develop an appropriate response.

The Alliance for Sustainable Building Products said one answer to reduce the embodied energy was to use natural building materials, as they have low embedded energy, the thermal mass to store heat, are safe, healthy and breathable and do no damage to the environment.

This also has the advantage of providing a means of sequestering carbon (i.e. soaking up). ASBP research into sequestered carbon has shown that bio-renewable materials typically have a carbon content of between 40-50%.

What low impact materials are available?



Foamglass made from recycled car windscreens a direct replacement for petrochemical foams





Recycled Materials





Insulation from Grass waste

Alternative Renewable Materials, Hemp and Flax Fibre







Wood fibre and products from recycled cellulose and wood





Masonry Solutions

DIFFUTHERM | System description:

The NBT Masonry Diffutherm System is for externally insulating masonry buildings where they are to be externally finished with render.

NBT Diffutherm systems use woodfibre boards over the outside of the building in a continuous layer, thus providing a high performance unbridged thermal shell, with excellent acoustic properties, in a fully breathing construction. Mineral based breathable renders are provided for the outside of the wall, along with a range of fixings, tapes and rails. Mineral plasters and environmental paints can also be provided for the inside of the building.

NBT Masonry DIFFUTHERM System



System Application:

Existing buildings: NBT Diffutherm systems are highly vapour open and hygroscopic making them very suitable for the thermal upgrading of existing solid wall buildings as well as brick-infilled traditional timber frames, all of which need to breathe. They can also be used with cavity constructions **New Masonry walls:** NBT Diffutherm systems can be used with both new solid wall and cavity walls.



System Benefits:

- Excellent thermal performance, with reduced thermal bridging and excellent ψ (psi) values
- Highly vapour open and hygroscopic system ensuring fully breathing and dry walling, with reduced risk of damp and interstitial moisture.
- Excellent acoustic performance, increasing flanking sound protection
- Increased overheating protection
- Simple, robust detailing with full systems parts
- Full design and site support from NBT
- Tried and tested system, fully certified

Environmental Performance:

Woodfibre boards are non-toxic, contain over 95% waste wood from sustainable forests, and lock up 1.2 tonnes of CO_2 for every tonne of boards produced. They are BREEAM Green Guide, and WRAP assessed.



Wood fibre Why not made in the UK?

Masonite Carrick on Shannon







There is manufacturing of timber products but are we making the right products?







Hofatex factory in Slovakia operating since the early 20th century



One man's trash: PAVATEX transforms softwood sawmill waste into high-quality insulation.



Why don't we make wood fibre materials in Northern Ireland?

Spanboard factory Coleraine had fantastic facilities for re-using waste timber

7 June 2012 Last updated at 12:21

Fears for 19 jobs at Spanboard

Nineteen jobs are under threat at Coleraine chipboard makers Spanboard.

The company is holding talks with staff about the future of the plant.

The 19 staff make and distribute melamine laminate throughout Ireland.

William Laverty, Operations Manager, said: "The decision to enter into consultation has been taken in the face of increasing costs and shrinking margins in an industry that is still very deep in recession."

He added: "We have commenced talks with union representatives, and will be focusing on talking to our employees, customers and suppliers regarding the next steps."

The company shed 90 workers three years ago

The company has operated in Coleraine since 1989. Before that, it was known as the Ulster Chipboard Company, and has operated on the same site for over 50 years.





Sheep's wool is made in North Wales







2008 Welsh Assembly Government launched major programme of support for local timber, energy efficiency and natural materials including the Ty Unnos project using local timber





Timber Frame , naturally insulated and timber clad school in England

Why use a wonderful sustainable renewable form of construction such as timber frame and then fill it with synthetic petrochemical based materials?



TIMBER EXPO

NEC BIRMINGHAM 24&25 SEPTEMBER 2013

SUSTAINABLE | CONSTRUCTION | INNOVATION



28 May 2012

2 comments

Wood for Good Challenge your perceptions. Home About Why choose wood? Sustainability Case Studies Educa

WOOD FOR GOOD IS THE UK CAMPAIGN FOR THE PROMOTION OF WOOD

We exist to give you the facts and we aim to put sustainable wood at the heart of UK Government policy

Hackney clarifies: wood first equal

Hackney Council has reiterated that it is set to be the first local authority in England to promote timber construction in its planning policy - but has issued a statement making clear that it will not exclude alternative materials.

The clarification comes after lawyers told *Building* magazine that Hackney could be opening itself up to legal



challenges from the brick, steel and concrete industries if it made planning decisions based on a pro-timber policy.

Hackney London -Bridport House multi storey solid timber construction



Inverness: CLT and fibre insulation

Type

Location Builder/developer

Material Insulation

Grants

2 two-bedroom semi-detached wide-frontage houses of 78 m2 each Inverness, Fife Morrison Construction, Albyn Housir Association Cross-laminated timber Natural wood fibre, Crown Framethe glass wool £40,000 (RHP)





Low energy timber frame house: This one in the Mournes designed by Rachel Bevan has a wood burning boiler and uses other ecological materials

My summer building project



Built with Irish structural timber

Straw Bale Buildings An Introduction

The Experience of Straw Bale Building in Crossgar



NATURAL BUILDING

A Guide to Materials and Techniques



Tom Woolley Foreword by Jonathon Porritt

Research has shown that natural hygroscopic materials can behave better than synthetic materials with humidity and moisture



How to decide what to do??

- You cannot create good buildings through tick box systems devised by *envirocrats* who know little about building
- To be a BREEAM assessor requires only 3 days training and no prior qualifications or technical knowledge



The green building assessment jungle



ASBP Launch in Westminster November 16 2011



ABOUT US

THE CHALLENGE

A sustainable built environment is one of the most urgent environmental, social and economic challenges of the 21st century. Such a challenge demands an unprecedented transformation in how we understand, construct and use buildings. Sustainable building products are an essential part of this process, but have been largely ignored or inadequately represented in the recent past. The ASBP was set up to champion the cause of sustainable building products to ensure this issue is properly understood and valued, ensuring products that meet demonstrably high standards of sustainability become more widely adopted.

OUR MISSION

Our mission is to help accelerate the transformation to a sustainable built environment and society by championing the understanding and use of demonstrably sustainable building products.

OUR VISION

Sustainable building products will not only assist in delivering high performance, healthy and low carbon buildings, but will help to promote sustainable social and economic development, and to foster a broader understanding of the relationship between people, nature and resources. In this way they can act as a catalyst for transformation at many levels.

OUR APPROACH

In order to succeed in our mission the ASBP will:

- Be a cross sector organisation that is transparent, rigorous, not for profit and entirely for public good.
- Provide structure and leadership to support the use of sustainable building products.
- Promote and develop sustainable product standards (for both manufacture and use) with particular focus on the Natureplus eco-label.
- Encourage credible research to improve the understanding of sustainable products and related issues.
- Promote the benefits of sustainable building products to policy makers, industry and the public.
- Campaign for more effective legislation, funding and public procurement policies to promote the uptake of sustainable building products and ensure their development for the public good.

GOVERNANCE

To gain influence the ASBP must achieve widespread trust and respect. This credibility will be underpinned by an approach that is consistent with the need to be for public good. In practical terms this means:

- A constitution that lays down ethical criteria for the organisation's aims and processes.
- b A governing board with a balance between commercial and not for profit / charitable interests.
- A charter for membership.
- Multi-sector membership and participation.
- Solution An approach to environmental assessment which is rigorous, balanced and product specific.

CURRENT POSITION

ASBP is being constituted by a group of manufacturers, distributors, academics and consultants and is managed through the Sustainable Development Foundation. It is still in the stage of set up, with constitution, charter, membership rates, website and other key issues being finalised. The official launch event is at Westminster Palace on the 16th November.

For more information contact:

Gary Newman (CEO) on 07968 209303 or info@asbp.org.uk

The Alliance for Sustainable Building Products ≠ Ground Floor, 1 Baldwin Terrace, London N1 7RU 0207 704 3501 ≠ www.asbp.org.uk ≠ info@asbp.org.uk







Responsible materials requires something like Fair Trade



Set a sign ...

... for sustainable building products

Build and renovate for the future

The European quality label for the protection of the climate and resources in building, energy efficiency and healthy accommodation.





Petrochemical based insulation materials are not the answer

(thanks to English Heritage for this picture)

Foam insulation recently installed in a house in Donegal, according to the owner, has shrunk leaving big gaps

Countless studies show that synthetic insulation materials under perform

FUTUREFIT FINAL REPORT PART TWO

An insight into the retrofit challenge for social housing

Affinity Sutton "Futurefit" report on the Green Deal casts great doubt on whether it is worthwhile. SAP overpredicts energy performance by 77%

DID SAVINGS MATCH THE SAP PREDICTIONS?

SAP is well established as the energy modelling tool for new build properties. It is now also the central tool in the Green Deal assessment process to predict what savings can be made in a home from energy efficiency improvements. Assessing how properties fared against the predictions of this model was an important part of the process.

KEY FINDINGS:

- The SAP model used in FutureFit over-predicted the savings by an average of 77%:
 - Average saving in gas heated properties was £49 a year.
 - Average SAP modelled savings in gas heated properties was £217 a year.
 - Difference: 77% less than predicted.

Futurefit also raises fears about mould and condensation



WARM, AIR TIGHT BUT UNHEALTHY HOMES?

As well as understanding any benefits residents felt, it was important to know if there were any other consequences of the project. All FutureFit works properties had air tightness measures carried out. These were paired with appropriate ventilation systems, an approach that will not necessarily be taken under the costs-led Green Deal. Despite this, there were still some issues with damp, mould and condensation in certain properties. For one particular household, this led to all the works being removed, despite several weeks of engagement around their lifestyle.

KEY FINDINGS:

- Total of 78 issues reported at 55 properties.
- 27% were issues related to ventilation systems.
- 17% directly related to damp, mould or condensation.
- These issues were often reported together.
- Perception that heat recovery ventilation was "too noisy" and used more energy.
- Ventilation is a complex topic, with ingrained behaviours attached.
- One resident specifically stated that the ventilation was not sufficient and that making her home warmer had only made it unhealthy, as all the fresh air could no longer come in.



Wrapping buildings in plastic to make them more air tight using petrochemical based materials may be bad for buildings and our health Would you sleep under a plastic sheet? Using plastic is bad for our health and the environment Synthetic materials are not breathable







Problems with air tight buildings "Breather" members do not always prevent condensation. Synthetic materials cannot cope very well with moisture

Bad building and toxic materials affect our health







Tests on modern energy efficient homes reveals dangerous levels of indoor CO2. This provides an indicator of high levels of other dangerous emissions from VOCs, formaldehyde etc.

(Thanks to Tim Sharpe of MEARU Glasgow)



Hemp Lime Insulating Masonry

Locks up carbon in the building fabric so is better than ZERO CARBON





http://www.sustainandbuild.com/site/Video.aspx? y=Kk~plus~Y1/7Cr~plus~o=

The you-tube video has had over 30,000 hits

CAT: Wales Institute of Sustainable Education

Hemp lime house using hempcrete in Cloughjordan Ireland



Drumalla House, Carnlough, County Antrim: hempcrete and sheep's wool

Type11 houses (10 two-storey semi-detached houses,
1 wheelchair bungalow), CSH Level 4LocationDrumalla House, Carnlough, County AntrimBuilder/developerMSM Construction Ltd. for Oaklee
Housing AssociationMaterialTimber frame, hempcrete walls, PV panels, mechanical
ventilation heat recovery systemsInsulationSheep's wool
£110,000 (RHP)



prestigious industry awards

Uniquely, under the Renewable Construction Demonstrator Programme, the dwellings incorporate renewable materials such as sheepswooi attic insulation and shredded newspaper cavity and floor insulation. The timber frame dwellings also have a Hempcrete outer skin in

place of concrete. All of these elements reduce the carbon footprint of the dwellings, with this scheme being the largest in Ireland to use this construction method.

Group Chief Executive lan Ellott said: "Drumalla Park is an exemptar housing project for building sustainable communities through development and regeneration. The pioneering energy efficient features of the properties have received extensive recognition, with the Beltast Telegraph listing it as one of the top 50 places to live in Northern Ireland, and the achievement of a UK Green Apple Award for Building and Construction and a CIH Award. These esteemed awards are testament to Caklee's desire to be at the forefront in developing energy efficient housing schemes."







Renewable Materials are materials that can be grown and replaced

Here is a hemp field in Northern Ireland



Processing hemp & Flax was an important industry in NI in the 19th century







Using hemp and lime for renovation











Building on Tradition

A Sustainable Design Suite for the Northern Instand Countryside





Save the Date 9th & 10th April 2014

For Stand Enquiries

Contact Golda Burrows: 028 9268 8888 or Mags Morgan: 07515 735455

DON'T MISS OUT

featuring at the





Lets hope we see more emphasis on sustainable construction in Northern Ireland in future