



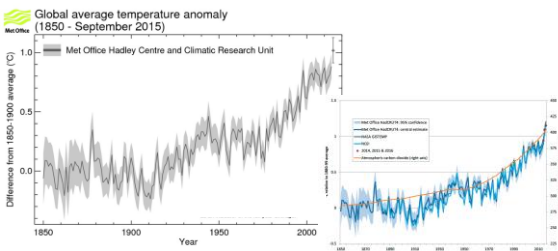
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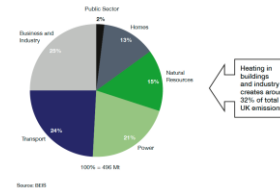
Timber in the 21st Century

Dr Graham Ormondroyd
The BioComposites Centre
Bangor University

Climate Change – It is real and evident

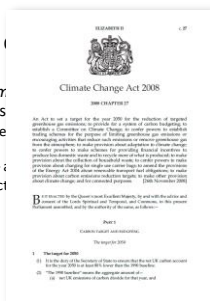


What are the primary sources of emissions in the UK?



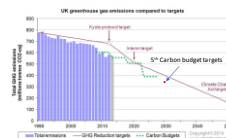
What are we doing about climate change?

- *Tragedy of the commons* – will happen if all agents act in their own self-interest
 - Kyoto protocol – signed 2002
 - Paris agreement – signed 2015
 - Climate Change Act 2009



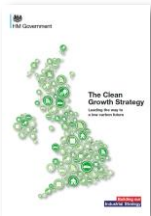
...emissions will not
...in carbon release by
...be kept below 2 °C

What are we doing about climate change?



- With Current UK policies the 2nd and 3rd Carbon Budgets will be achieved.
- There is a UK policy gap which endangers the delivery of the UK's 4th, *beginning in 5 years time*, and 5th, *10 years time*, Carbon Budgets

How are we responding and is this pertinent to BWF members?



- Increasing forest cover and the timber resource.
- Ensure that the land plays a central role in carbon capture
- *We will work with industry to increase the amount of UK timber used in construction, creating a conveyor belt of locked-in carbon in our homes and buildings.*

Significant government investment into Green Growth



- Including
 - Housing and construction
 - Housing
 - Land Use

Up-surge in government funded timber projects

- Knowledge Transfer Partnership (2016-2018) 'Development of UK home grown timber laminated products'
- Innovate UK (2017-2019) 'LaserCure'
- SMART Partnerships (2017-2018) 'Environmentally Friendly Timber Bleaching'
- Knowledge Transfer Partnership (2018-2020) 'Assessment of novel UK species for resin modification'
- Knowledge Transfer Partnership (2018-2021) 'Assessment of environmentally friendly bleaching and dying of timber veneers'

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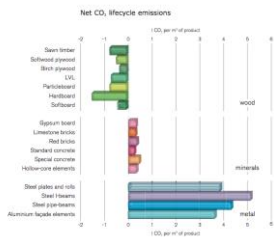
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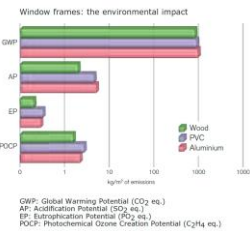
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How does the timber industry respond to this and how can Timber Science help?

Net CO₂e life time emissions of 'raw materials'



It may not be as clear cut when taking into account the 'whole-life' of a product



Timber frame housing

UK	2005	2007	2009	2011	2013	2015
Housing starts	224210	233770	115420	138600	149670	149500
Timber frame	17%	23.3%	25.6%			c. 28%

UK Government suggest aimed for 300,000 new starts per year



Timber in construction

	House Brick and block	House TF	House TF Tim clad	Flat CLT
Wood (Burnett 2006)	7.1 m ³	10.31 m ³	14.93 m ³	
Wood (CEI-bois)	4.3 m ³	7.8 m ³		21.3 m ³
Wood (John Gilbert Arch. 2005)		10 m ³ to 27 m ³		
Engineered wood				28 m ³ to 38.4 m ³

Model house

	Masonry	Timber
Solid wood	8.82 m ³	14.55 m ³
WBPs	3.36 m ³	5.99 m ³
Aerated block	309.2 m ²	0
Brick	222.1 m ²	222.1 m ²

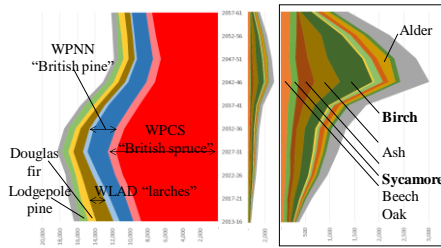
- Typical composition for single 4 bed detached dwelling
- Other components e.g. roof tiles, assumed to be equal as shape identical



Timber Production in the UK



Prediction of Timber Production



What is 'Timber Modification'

- [Timber] modification involves the action of a chemical, biological or physical material, resulting in a desired property enhancement during its service life (Hill, 2006)

Timber modification

- Three current commercial forms of timber modification
 - Acetylation
 - Resin Impregnation
 - Thermal Modification

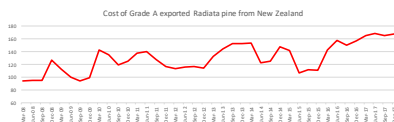


However most of the technologies are competing for...

- Radiata pine



Rise in price of Grade A Radiata pine



It is possible to modify UK timber

- **Acetylation** – whilst possible much of the technology is tied up in patents and licensing agreements from Accoya, However Tricoya chips set to be modified in Hull
- **Resin impregnation** – New company set up in South Wales – Fibre 7
- **Heat treatment** – Pilot scale work undertaken at Bangor with 2 kilns in North and South Wales. Brimstone producing in South of England

Acetylation in the UK

- Scheduled to open 2019
- Employ ~30 permanent employees
- Take spruce / pine / fir similar to trad. MDF plants



Resin Impregnation in the UK

- Located in Barry, South Wales
- Currently trading small amounts of treated timber
- Up scale production Q2 2018



Resin Impregnation in the UK

- Currently using traditional '*modification timber*'
- Current projects to investigate UK species including *Laser incising* to be able to treat non-permeable species



Heat treatment in the UK

- Brimstone, South England
 - Heat treatment of hardwoods
 - Ash
 - Poplar
 - Sycamore
- Pilot scale kilns
 - Treated both hardwoods and softwoods
 - Inc. larch and pine

Heat treatment in the UK



Conclusions

- There is a fledgling TM industry in the UK working across all three major modification types
- There is the demand. The UK is looking to invest in clean technologies including timber and timber in construction
- There is a wood science R&D base in the UK and this needs to be exploited
- We need to match the technologies with the available timber and visa versa

Centre for doctoral training in *Future Timber*

- Bangor, Edinburgh Napier and Surrey Universities
- A centre for 50 PhD students in Timber Science
- All students will be CASE award scholars
- Fulfill a need of the industry
- Cheapest research you will find

- Spanning all areas of the timber industry
 - Including new species; timber treatments; use; end of life
 - Fundamentals through to application

Timber 2018

- 26th / 27th June
- In London
- A showcase of Timber research in the UK
- Covering all topics from wood science and engineering to architecture

Thanks for listening, come and see us?

