Comisiwn Coedwigaeth Cymru
Forestry Commission Wales

Conference Summary

Forests and climate change
A convenient truth?

Victor Salvi Room, Millennium Centre, Cardiff
18 June 2008

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Conference Summary

Introduction

This one-day conference in Cardiff Bay brought together 100 senior policy-makers, opinion formers and climate change experts from government, non-governmental organisations (NGOs) and the private sector. The conference aimed to take a closer look at some of the issues, the challenges and the opportunities surrounding climate change in Wales and beyond.

Jon Owen Jones, Chairman of the Forestry Commission Wales National Committee opened the conference and introduced Elin Jones AM, Minister for Rural Affairs, who gave the keynote speech. Tim Rollinson, Director General of the Forestry Commission followed the Minister and outlined the international perspective and action at a GB level. Six of the UK's leading experts then gave presentations on forestry and climate change throughout the remainder of the conference.

An interactive approach was taken during the conference. Betsan Powys, BBC Wales's Political Correspondent, acted as master of ceremonies and engaged delegates in electronic voting on key questions that arose during the day. Results of the votes were immediately projected on a screen and speakers were invited to comment both individually and during an end-of-conference plenary session.

Elin Jones, AM,
Minister for Rural Affairs

Opening Address

Elin Jones, AM, Minister for Rural Affairs

The Minister explained that, although not an expert, she had some personal observations on climate change that she wished to share with delegates:

- Firstly, it is hugely important. Even though Wales is small and forests cover just 14% of the land surface, we still have the ability to make a difference. And if the government isn't leading the way with the public forests that it owns then how can we expect others to make the difficult choices required to make a bigger impact domestically and globally?
- Secondly, it's complex. The Minister looked forward to presentations on the global carbon dynamic and some of the economic considerations. She welcomed all attempts to take these technical issues and turn them into an easily understandable set of actions that will broadly mean that we are doing the right things with the trees and forests of Wales. In this context she highlighted recent initiatives by the Forestry Commission including the *Forests and climate change* DVD, as well as the ongoing work to produce guidance for woodland managers on adaptation responses.

The Minister then went on to talk about the impending launch of a public consultation on the Welsh Assembly Government's woodland strategy, in which the role of trees and forestry in helping to tackle climate change will be a fundamental consideration.

She said the revision of the woodland strategy is our opportunity to reassess it in light of the Assembly Government's *One Wales* commitment to create "a Welsh National Forest of native trees to act as a carbon sink".

The Minister concluded by setting out her views on the main issues for the strategy review including:

- **Wales's woodland cover** we need to consider whether we need more woodland and, if so, how much and where can new woodland help most in helping to tackle climate change.
- **The roles for our existing woodlands in helping us tackle climate change** in this discussion we will consider the role of growing trees as a carbon sink, as well as the impact that timber and woodfuel can make in helping to reduce carbon dioxide (CO_2) emissions from fossil fuels. We need to consider how to better harness and utilise the unique quality of timber as the ultimate renewable resource. In addition we will take into account the important interaction of trees with soil carbon and identify the situations where the intensive management of trees start to make less sense.
- **The need to adapt the woodlands themselves to climate change, so that they are still there in the future to help us in any, or all, of these ways** FC officials and researchers are already identifying the best adaptation strategies and considering the importance of action at both the individual woodland and the landscape level.
- **The role that woodlands and trees can play in helping people adapt to a changing climate** – we will consider the role of trees and woodlands in a variety of adaptation roles including water management and microclimate regulation in urban areas.

Forests and climate change DVD

Jon Owen Jones introduced the Forests and Climate Change: *A convenient truth? DVD*.

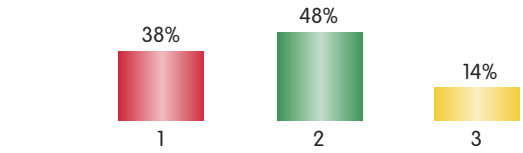
This powerful DVD explains how trees can be a tool for tackling climate change; it shows how trees soak up carbon from the atmosphere, and that they are environmentally friendly, efficient, reliable, cheap, and easy to produce.

Following the DVD Betsan Powys began the electronic voting with a warm-up question on delegates' reasons for attending the conference. The results are shown below

Delegate Voting

Why have you chosen to attend the conference today?

1. Genuinely interested and want to learn more
2. Very relevant to my work at the moment
3. My boss sent me!

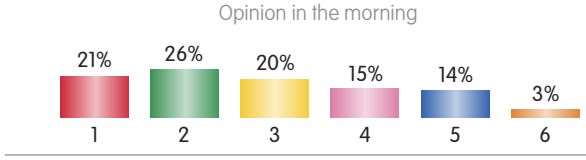


A second question was then asked which was repeated at the end of the conference and aimed to assess the initial views of delegates and whether these had changed by the end of the conference.

Delegate Voting

Select the three best ways in which you think forestry in Wales could help tackle climate change: *(No preference)*

1. Plant more trees
2. Increase the use of wood products
3. Use more wood for fuel
4. Protect woodlands as a store for carbon
5. Manage woodlands differently
6. Other (forestry) methods should be used



Conference speakers

Sustainable Forest Management: An International Perspective

Tim Rollinson, Director General, Forestry Commission

Key Points

- Sustainable forest management is the key to forestry effectively helping to tackle climate change.
- Lessons learnt in the UK can inform global developments.

Tim focused on the crucial requirement for sustainable forest management in tackling climate change, both internationally and domestically. He set out the importance of the world's forests but stated that, globally, we are not looking after them.

As the DVD showed, forest cover has changed rapidly over time, with some parts of the world experiencing deforestation at an incredible rate. In the UK and Wales, Tim explained that we reached an all time lowforest cover just a hundred years ago but that we have since rebuilt our forests and that, although still low in percentage terms, it is a big improvement.

The scientific knowledge and the practical experience we have gained from restoring our forests and now managing them in a sustainable way, will prove invaluable in our fight against climate change.

Tim discussed the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment report, which was published in 2007. And quoted: "Forestry can make a very significant contribution to a low-cost global mitigation portfolio but this opportunity is being lost … and has resulted in only a small proportion of this potential being realised at present".

Tim listed the IPCC's forestry options:

- Reduce emissions from deforestation.
- Enhance sequestration in existing and new forests.
- Use woodfuels as a substitute for fossil fuels.
- Use wood products in place of energy intensive materials e.g. concrete and steel.

The UK has been at the forefront in understanding how to manage forests sustainably. The UK Forestry Standard sets the benchmark, and the UK was the first country in the world to have all its public forests certified as managed sustainably. This means that many countries around the world are now seeking UK experience and expertise.

Tim introduced an action plan for forestry and climate change:

- Assessment of forestry's contribution to tackling climate change.
- Development of a centre for forestry and climate change

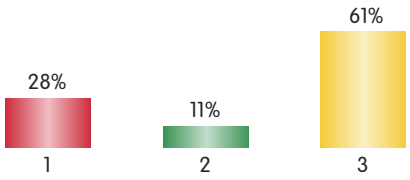
- Establish a framework for woodland carbon management and emissions offsetting, to include:
  – standards and guidelines
  – protocols for carbon assessment and monitoring
  – a code of practice for woodland offsetting schemes
- Establishment of a forests and climate change network.

Tim concluded that the foundation for forestry's contribution to combating climate change is sustainable forest management, stating that in the UK we have 90 years of experience to draw upon and share. We have the knowledge, skills and technology and now we have to show that we have the willpower!

Delegate Voting

Should we use the UK's experience to help internationally or just focus on domestic issues?

1. Yes - help internationally
2. No - International activity by the UK is a distraction
3. Do Both



Carbon and Forest Management

Robert Matthews, Carbon Scientist, Forest Research

Key Points

- The greatest positive carbon impact can be made by managing forests sustainably for products that can substitute for materials that have a large carbon footprint.
- Forestry offset schemes are potentially helpful if well-designed and regulated.

Robert outlined how the UK forests contribute to the carbon cycle on both a local and a global scale and he repeated the message we had heard in the DVD, that we have established human activity is interfering with the global carbon balance. The major factors behind this are the burning of fossil fuels and deforestation.

He went on to outline the global carbon cycle in the following terms. The burning of fossil fuels during the 1990s was responsible for the release of 6.3 GtC (gigatonnes of carbon) a year into the atmosphere, of which 1.7 GtC was absorbed by the oceans. Deforestation added another 1.6 GtC in carbon to the atmosphere with enhanced vegetation growth and reforestation absorbing about 3.0 GtC a year. So the net emission to the atmosphere was 3.2 GtC per year.

In response to this analysis Robert suggested that many people are asking the question "Can we plant our way out of this situation?", which is the background to carbon offsetting schemes.

Robert set out in simple terms how some of the principles of additionality and saturation need to be considered when setting up a carbon-offsetting scheme. It is also vital to ensure that the scheme is well-regulated to avoid potential pitfalls of the offsets either being sold for woodland that already exists or where new woodland is being created, or selling the credits more than once.

Robert went on to explain how sequestration eventually equals decomposition in the forest ecosystem, known as the saturation point. When this carbon balance point is reached, the forest becomes a reservoir, so for new emissions to be offset it is necessary to plant a new forest area.

Robert's conclusions were that, globally, forests play an important part in the carbon balance. And because forests are a renewable resource, he gave some global options for mitigating climate change:

- Afforestation.
- Reforestation.
- Adjustments to forest management.
- Avoiding deforestation.
- Targeted timber utilisation.

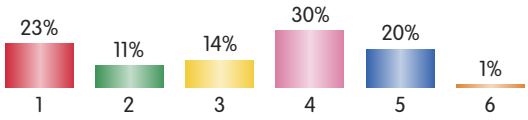
He also offered some UK options:

- UK forests can make a small but useful contribution.
- Carbon sequestration can be a hostage to fortune if it is viewed in isolation.
- Emissions saved through (home grown or imported) wood are 'banked'.
- Focus on use of wood at least as much as forest management.
- Consider the role of imported wood.

Delegate Voting

Select the three best ways in which Welsh woodlands can be managed to help mitigate climate change: *(No preference)*

1. Use continuous cover forestry methods more extensively
2. Extend rotations of even aged forests
3. Shorten rotations of even aged forests
4. Maximise wood production
5. Just focus on sound forest management
6. None of the above



Wood for Fuel

Dr Robin Cotton, Managing Director, Wood Energy Ltd

Key Points

- Woodfuel has an important role to play in the overall energy supply mix.
- There are important secondary benefits to increasing the use of woodfuel.

Dr Robin Cotton's presentation showed how state-of-the-art technology enables woodfuel to provide an efficient and low-cost option for heat and power at domestic and industrial levels.

In Wales his company, Wood Energy Ltd, has 23 biomass boilers installed or under construction. These boilers range from 50 kW to 1MW and their estimated consumption is c.4,000 tonnes of woodfuel per annum with an estimated carbon saving of c.2,500 tonnes of CO_2 per year.

In the current climate of high oil prices, Robin showed the savings that can be made by converting to biomass boilers, either powered by wood chip or wood pellet.

Robin explained the key differences between these woodfuel types.

Wood Pellets

- High density, low moisture content.
- Standard product.
- Tanker delivery – flows similar to a liquid.
- Boiler and fuel store generally simpler and cheaper.
- Many production facilities now in the UK.

Wood Chip

- Can vary in particle size and moisture content.
- Low bulk density.
- Less easy to handle.
- Widely available – sawmill residues, forestry residues, clean recycled wood, energy crops.
- Lower cost per unit of energy.

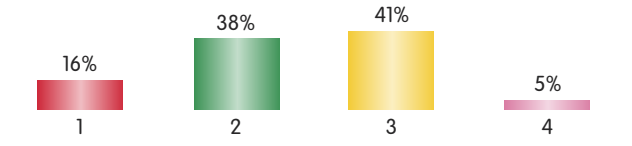
Robin went on to explain that the boiler technology is high quality, with trained local technicians available in the UK, but the biomass market is still relatively small. The best strategy for expansion of the industry is for it to be demand-led.

He concluded his presentation by suggesting that biomass heating has a central role to play in the UK's energy mix. As well as making a significant contribution to reducing carbon emissions and improving the security of supply, biomass heating can also help the local economy.

Delegate Voting

Do you think that developing new wood energy supplies in Wales is important?

1. Yes - all options should be developed
2. Yes - but it is important not to over-ride other land use objectives
3. Yes - but our primary focus should be to better manage existing woodlands for wood fuel and other benefits
4. No - woodfuel in Wales is irrelevant



During the vote Betsan asked Robin which choice he would like delegates to select. He responded that option one would be his preferred choice. In response to a question concerning the availability of timber for woodfuel, Robin highlighted that there are under-utilised supplies in both the woodlands of Wales and also in the waste stream. These are the supplies we should concentrate on for woodfuel.

Wood – A Twenty-First Century Material

Craig White, Chair of Wood for Gold and Director of White Design

Key Points

- There is huge potential for the use of wood in construction.
- The role of wood needs to be highlighted through high-profile work, but also with improved education.

Craig examined the potential for wood to meet wide-ranging uses that substitute for more carbon-intensive materials. In particular, he described its potential for use in the construction industry.

The carbon footprint of a material can be examined according to its embodied energy – that is, the quantity of energy required to manufacture and supply it to the point of use. The level of embodied energy in timber is lower than in other materials and, if correctly maintained, timber is as sustainable and long-lasting as alternatives. He provided some maths on this – one tonne of timber used as building materials requires 640 kW-hours of energy in its transportation and production, thereby releasing 480 kilograms of CO_2 into the atmosphere. A tonne of brick requires four times that amount of energy, concrete five times, glass six times, steel 24 times and aluminium 126 times. It is even possible to construct buildings that are carbon negative, meaning that they store more carbon in the wood than is produced during the transport and manufacturing of the building.

Craig provided examples of how wood can be used in construction. Wood is a versatile material that can be used in many aspects of construction, and can provide striking architectural designs. Ensuring a high standard of timber is critical.

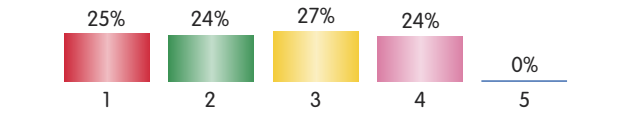
Wood also offers a significant market opportunity in prefabricated buildings and in cellulose-based construction where, for example, its use may be combined with straw in providing insulation.

Craig explained how the Wood for Gold initiative is championing the role of wood in the 2012 Olympic Games. The initiative aims to implement a timber procurement policy that is both environmentally responsible and acceptable, and hopes to reinforce the wood industry's standing with key stakeholders. Here, and more generally, effective information, education and marketing are vital, as is the need to develop effective supply chains. Much confusion remains around the use and sustainablity of wood products.

Delegate Voting

Select the three best ways of encouraging the use of more wood in place of other materials *(No preference)*

1. Improve understanding of sustainable properties
2. Improve the supply chain
3. Present simple guidance to designers
4. Promote new uses of wood
5. There is no need to further promote the use of wood



Betsan asked Craig if the results were what he expected. He stated that the results were very similar to the London event. Craig's personal choice was option four, to promote new uses of wood. Designers want to use wood; they may not know enough about it and the industry needs to be able to respond to that. He would like to see more development in this area.

Cost-Effective Carbon

Professor Colin Price, Forest Economist, Bangor University

Key Points

- The economics of carbon fixing is complex but important.
- Forestry options score well, especially material substitution.

Professor Colin Price gave a presentation looking at the various methods of costing carbon and how forestry fits in.

He presented several carbon-reduction methods and outlined the large variation in carbon costs and timescales in which the various methods can be carried out. He showed that forestry sat in the middle of the scale in terms of the cost of carbon reduction – more expensive than energy-saving light bulbs, but much cheaper than fuel tax.

Colin then went on to discuss how a tonne of carbon can be costed. He explained that there are two general approaches to costing:

- Comparison between two equilibrium states (e.g. a forestry management system fixing carbon and one which is not). This method considers the total carbon stock of each system.
- Profile of a change in state through time (where the price for carbon is considered as the price that will allow investment in carbon fixing to break even). This method considers the amount of change in carbon stock of a management system through time.

Colin introduced economic discounting principles, stating that the carbon costs were highly dependent upon the discount rate being applied. This was particularly pertinent to the next discussions of growing stock options and timber utilisation options.

Colin next considered options for growing stock on which to base carbon costs. He put forward four options:

- **Commercial Sitka spruce versus unmanaged woodlands**, which would give relatively cheap carbon costs for unmanaged woodlands over commercially managed ones (without discounting).
- **Longer rotations of existing commercial woodlands**, which would also represent cheap additional carbon storage.
- **Conversion to single-tree continuous cover forestry**, which could be perceived as relatively expensive method of additional carbon storage if that were the only objective. But it could also be perceived as a free method of additional carbon storage if transformation to continuous-cover forestry is supported as a way of achieving many other objectives.
- **Changing species from Sitka spruce to oak**, for which there would be no net benefit in terms of carbon storage, and would also cost to carry out the transformation.

The next thing Colin considered were the relative carbon costs of various timber utilisation options:

- **Fix fossil fuel emissions in the growing woodland** – more favourable at a higher discount rates.
- **Growing biomass fuel** – more favourable at the lower discount rates.
- **Using timber as a replacement material for other building materials (concrete and steel)** – lower carbon costs at lower discount rates, and much more so if replacement of steel is included in the calculations.

The conclusion was that by far the smallest carbon cost per tonne of carbon fixed is in using timber as a replacement material for other building materials, with biomass fuel a greater carbon cost.

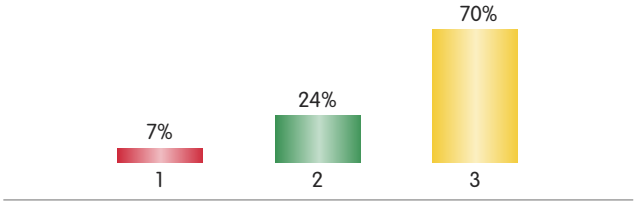
Colin concluded that the most cost-effective options for carbon fixing in Welsh forestry are:

- To continue to practice productive forestry.
- To use timber for structural material replacement.
- To use the discount rate to our benefit.

Delegate Voting

Ought carbon fixing in forestry to be costed as:

1. A short-term fix pending introduction of a permanent way to reduce atmospheric CO_2?
2. A means of displacing CO_2 emissions from fossil fuels until more sufficient alternative sources of renewable energy emerge?
3. A strategy that will be effective in keeping carbon locked up in products and structures for a long time?



Adapting for Change

Dr Mark Broadmeadow, Climate Change Programme Manager, Forestry Commission

Key Points

- We need to diversify our woodlands in order to protect our forest ecosystems.
- We need to act now in order to develop woodlands adapted to a future climate.

Mark began by asking the question – "What do we want to protect?"

He stated that we cannot have a 'one size fits all' approach. We need woodlands that can provide the services they do now for future generations and that, as functioning ecosystems, they will continue to adapt themselves. But we have a duty to protect our landscape and natural environment, perhaps through more proactive measures.

Some future emissions scenarios suggest that the climate in south-west Wales could become like that currently experienced on the Brittany peninsula or in northern Spain. Under such a scenario, a species would typically have to move to keep pace with this change at 40 feet per day. This would evidently pose a real challenge.

Mark recommended a number of options to make existing ecosystems more resilient:

- Good woodland management – promote regeneration and reduce other pressures through deer, fire and wind hazard management.
- Enlarge existing woodlands.
- Create habitat networks to encourage natural adaptation/evolutionary processes.
- Relax designations to reflect likely changes in community structure that will form the functional woodland ecosystems of the future.

Mark also suggested enhancing the resilience of native woodlands by:

- Redistributing native species within the site/landscape/country.
- Diversifying species composition by:
- mixing species stands, including for commercial timber production
- diversifying within wood/forest/landscape.

Mark stated that we need to ensure that our species choice reflects the adaptation pressures but that wider benefits and considerations are also taken into account. Forest Research has developed a database which helps with this wider analysis to inform tree selection in urban situations.

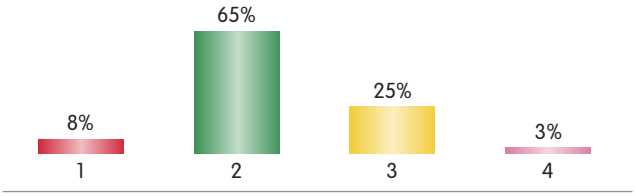
Mark went on to outline several barriers to effective adaptation, which include the level and rate of change predicted, pests and diseases and too rigid a policy concerning nature conservation. And he summarised by suggesting that the biggest barrier to adaptation is complacency.

Mark concluded that there are options that we can take now to secure the resilience of woodlands for the future. We should diversify to insure against uncertainty. Above all, we should not panic, and should take the opportunities that climate change presents.

Delegate Voting

Do you believe that woodlands will need to be adapted to climate change?

1. Yes - but natural adaptation is all that is needed
2. Yes - some intervention necessary but need not affect other objectives
3. Yes - major intervention required which will affect other objectives
4. No adaptation required



Planning for Change

Professor Chris Pollock, Chief Scientific Advisor to the First Minister

Key Points

- Climate change is only one of a number of global drivers that will impact on Welsh forestry.
- Welsh woodlands have a small but important role to play in this bigger picture.

Professor Chris Pollock discussed land use in the UK, which will alter significantly in the coming years. Only part of this change will be driven by climate change. Of much greater significance will be increased global demand for food, competition for resources and the recognition of the importance of ecosystem services as a product of land management.

Global trade in agricultural and land use commodities is increasing and Chris outlined how this will impinge on us much more than the direct effects of climate change. Chris summarised by suggesting that worrying about whether it is going to rain more or less is relatively unimportant, given the bigger picture.

Instead we ought to worry about where the rest of the world is going to obtain the things that currently they are obtaining with relative ease. The problem is far beyond climate change, because there are a whole series of multipliers that are going to compound the effects of climate change. Including:

- Growing competition for water.
- Increasing population.
- Increasing demand for animal products.
- Increasing competition for land.
- Increasing fragility of key ecosystems.

Chris illustrated this point by stating that 300 million tonnes of grain will be required by developing countries in the East, just to feed pigs and poultry, by 2050, which is roughly equivalent to the whole of the US grain harvest. Farmers are going to be in competition with forestry for land to grow these products. He went on to say that 2008 marks a turning point in history, as there are now more people living in cities globally than in the countryside: we are now an urban species. This means there will be an increasing competition for land just for urban development. Key ecosystems that we rely on are becoming increasingly fragile and breaking down, so how do we ensure life system earth is maintained in a way appropriate for that level of population.

Chris argued that this is what foresters should be planning for, rather than just focusing on climate change. He suggested that forestry has to take its place in policy-planning, developmental and land use terms.

Chris went on to outline where he did see opportunities for woodlands:

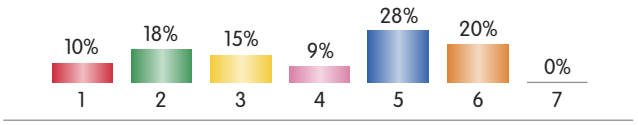
- Renewable energy.
- Renewable building materials.
- Carbon sequestration.
- Habitat restoration and wildlife corridors.
- Water management.
- Clean-up of diffuse pollution.
- Enhancement of landscape diversity.

Chris concluded that climate change could not be viewed in isolation - there are other factors that will impact on UK land use. So forestry does need to adapt but the sector should focus on real opportunities and the changes in policy and regulations that are needed to deliver them.

Delegate Voting

Select the three best situations where trees can most help to tackle climate change? *(No preference)*

1. In cities to reduce heat, dust and noise
2. As biodiversity reservoirs
3. On flood plains to reduce peak flows
4. In catchments to stop erosion
5. For fuel and timber
6. As carbon sinks
7. Non of the above

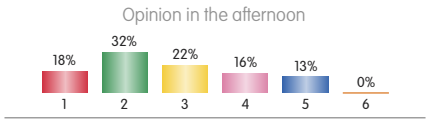


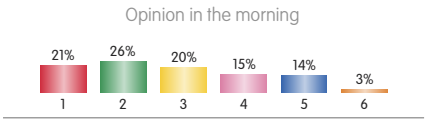
Final Delegate Vote

The final vote was a repeat of the second question from the morning session; a comparison was made to see whether delegates' views have changed as a result of the presentations.

Select the three best ways in which you think forestry in Wales could help tackle climate change: *(No preference)*

1. Plant more trees
2. Increase the use of wood products
3. Use more wood for fuel
4. Protect woodlands as a store for carbon
5. Manage woodlands differently
6. Other (forestry) methods should be used





Questions to the Expert Panel

The final session gave delegates the opportunity to put questions to an expert panel, made up of the speakers that had given presentations during the day.

Wide-ranging questions were posed. The questions raised, and the resulting discussions, are summarised below:

- **Where is the greatest policy change influence on climate change – Cardiff, Westminster or Brussels?**
  In terms of land use policy, Brussels probably has the greatest influence, although the Welsh Assembly Government is seeking to make the most of the influence it does have.
- **How are the sectors supporting the materials that timber is competing against responding to the challenge and the climate change agenda?**
  These sectors are responding but the more information about why timber is good that is provided, the better. It is not good enough to just state that it is good.
- **Do institutional structures act as barriers to delivering real climate change action?**
  They do not always help. The challenge is to discuss sustainable land use, rather than just aspects of this bigger picture such as environmental goods and services, deforestation, biofuels or even sustainable forest management.
- **Is planning policy a barrier to using more timber in construction?**
  Planning policies *per se* are probably not a barrier. However, their local implementation is sometimes a problem if specifiers and planners are not fully aware of the characteristics and properties of timber.

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- **Does the value for money aspect of public procurement militate against more timber solutions?**
  Timber is a cost-effective way of building but again the awareness of this needs to be developed.
- **What role does discounting have in economic decisions concerning sustainability?**
  It is a complete contradiction in terms to use discount rates to make decisions about sustainability. Sustainability decisions cannot be discounted - if they are to be sustainable.
- **How linked is the price of woodfuel to that of fossil fuels?**
  The woodfuel market is currently too small for there to be global commodity price and there are therefore some big geographical variations in cost and quality. There is currently little link between woodfuel and fossil fuel costs and the global timber price is much more of a determining factor.
- **What will be different about the Assembly woodland estate in 20 years' time as a result of climate change factors?**
  In 20 years' time there will be increased diversity but this may not be that visible. Carbon management is likely to become a bigger driver in that time period as well.
- **In an era of land use competition can we have forestry and agricultural products from the same land?**
  This is unlikely to be a big part of the future, except in terms of sustainable woodland grazing or perhaps under-cropping (e.g. by pigs). Of far more relevance is the true integration of farming and woodland at an enterprise level: small scale and part of the landscape mosaic, with products being removed from the woodland for on-farm use.
- **Could Wales get anywhere close to self-sufficiency in terms of timber production?**
  Theoretically yes, but in practical terms there are lots of other valid uses for the land that would be required to achieve this. Of far more importance strategically is that only a small proportion of the world's forests currently supply our industrial wood needs, many of them on an unsustainable basis. It would only require about 10-15% of the world's land to be under intensive forestry to meet all our needs for the future but this would be very challenging to achieve.
- **Will there be a further phase of the Wood Energy Business Scheme?**
  This scheme has done much to help kick-start the woodfuel market in Wales and FC Wales is optimistic that a further phase will be possible using EU funding and other sources.